

Table Of Contents

WA1 Artificial Intelligent Systems

Ballroom2, 10:20~11:50

WA1-1	A Vehicle Detection Using Selective Multi-stage Features in Convolutional Neural Networks	1
	<i>Won Jae Lee, Dong Sung Pae, Dong Won Kim, Myo Taeg Lim(Korea University, Korea)</i>	
WA1-2	Clustering Wear Particle Using Computer Vision and Self-Organizing Maps	4
	<i>Luis Fernando de Almeida, Marcos Alessandro Ramos, Bruno Leme, Jose Bizarria, Francisco Bizarria(University of Taubate, Brazil)</i>	
WA1-3	New Formula ZD4IgS_Q Applied to Solving Future Nonlinear Systems of Equations with Abundant Numerical Experiment Verification	9
	<i>Yunong Zhang, Jinjin Guo, Binbin Qiu, Yang Shi, Zhi Yang(Sun Yat-sen University, China)</i>	
WA1-4	Designing a Neuro-Fuzzy PID Controller Based on Smith Predictor for Heating System	15
	<i>Ali Dehghani(Coburg University of Applied Sciences and Arts, Germany), Hamed Khodadadi(Azad University Of khomeinishahr, Iran, Islamic Republic of)</i>	
WA1-5	Neural-Network-Based Vehicle Torque Demand Forecasting	21
	<i>Xun Shen, Tielong Shen(Sophia University, Japan)</i>	
WA1-6	Study on Object Recognition by Active Stereo Camera for Clean-up Robot	27
	<i>Takafumi Kijima, Naoki Sekiguchi, Hun-ok Lim(University, Japan)</i>	

WA2 Autonomous Vehicle Systems I

Ballroom3, 10:20~11:50

WA2-1	An Observertype Protocol Based Algorithm for A Dynamic Average Consensus	32
	<i>Juwon Lee, Juhoon Back(Kwangwoon University, Korea)</i>	
WA2-2	Vehicle Side Slip Angle Estimation Using Low-cost GPS/IMU	35
	<i>Sung Bong Hong, Chang Mook Kang, Seung-Hi Lee, Chung Choo Chung(Hanyang University, Korea)</i>	
WA2-3	Vision-based Autonomous Indoor Valet Parking System	41
	<i>DongHee Kang, Chang Mook Kang, JoongSik Kim(Hanyang University, Korea), Seunghyun Kim, W Choi-Yul Kim, Seung-Hi Lee(Hanyang University, Korea), Chung Choo Chung(Hanyang University, Korea)</i>	
WA2-4	Predictive Risk Assessment Using Cooperation Concept for Collision Avoidance of Side Crash in Autonomous Lane Change Systems	47
	<i>Hyunsoo Lee, Chang Mook Kang(Hanyang University, Korea), Wonhee Kim(Chung-Ang University, Korea), Woo Young Choi, Chung Choo Chung(Hanyang University, Korea)</i>	
WA2-5	Vision-Based Road Region Detection Using Probability Map of Road Color Features	53
	<i>Jae-Hyun Lim, Jun-Ho Jung(Korea University, Korea), Tae-Koo Kang(Sangmyung University, Korea), Myo-Taeg Lim(Korea University, Korea)</i>	
WA2-6	Efficient and Robust Drivable Region Extraction for Autonomous Vehicles	56
	<i>Lihua Wen, Kang-Hyun Jo(University of Ulsan, Korea)</i>	

WA3 [Mini] Machine Vision and Its Applications I

Ballroom4, 10:20~11:50

WA3-1	Moving Object Detection under Non-Stationary Camera via Multiple Foreground Clues	61
	<i>Hyemin Lee, Yonghyun Kim, Eunseop Lee, Bongnam Kang, Daijin Kim(POSTECH, Korea)</i>	
WA3-2	Ensemble Tracking with Deep Reinforcement Learning	63
	<i>Ilchae Jung, Bohyung Han(POSTECH, Korea)</i>	
WA3-3	Toward Flicker-Free Video Super-Resolution Using Temporal Gradient Loss	64
	<i>Younghyun Jo, Jae Yeon Kang, Seon Joo Kim(Yonsei University, Korea)</i>	

WA4 [Mini] Translational Rehabilitation Robots I

Mara, 10:20~11:50

WA4-1	Classification of Gait Phases with a Long-Short-Term Memory-based Neural Network	66
	<i>Suncheol Kwon, Won-Kyung Song(National Rehabilitation Center, Korea)</i>	
WA4-2	Proprioceptive Interaction between Two Arms using Position Sense at the Human Elbow Joint	68
	<i>Jun-ha Jeon, Kang-won Lee, U-Cheol Lim, Soo-Chul Lim(Dongguk University, Korea)</i>	
WA4-3	Development of the Wearable Walking Robot for Spinal Cord Injury, RoboWear10	70
	<i>Kyunghwan Kim(NT Robot, Co., Korea), Changyong Song, Wookbin Jin(NT Robot, Co., Korea)</i>	
WA4-4	Optimal Design of a Five-Link Mechanism for an End-effector Typed Walking Rehabilitation Robot	73
	<i>Jung-Joon Kim, Myeong-Ju Kim, Chang-Hwi Kim, Jung-Yup Kim(Seoul National University of Science and Technology, Korea)</i>	
WA4-5	Comparisons of two types of rehabilitation robot on upper extremity function	76
	<i>Stephanie Hyeyoung Lee, GyuLee Park, Joon-Ho Shin(National Rehabilitation Center, Korea)</i>	

WA5 [Mini] Robotics and Image Guide Technologies for Cardiovascular Intervention I

Biyang, 10:20~11:50

WA5-1	Development of a Miniaturized Continuum Manipulator for Endovascular Interventions within the Heart	77
	<i>Kiyoung Kim, Hyunsoo Woo(KIMM, Korea)</i>	
WA5-2	Development of Robotic Catheter Control Systems for Master-Slave Tele-operative Arrhythmia Ablation in Asan Medical Center	79
	<i>Youngjin Moon(Asan Medical Center & University of Ulsan, Korea), Zhenkai Hu, Hoyol Lee, Sanghoon Park, Jaesoon Choi(Asan Medical Center, Korea)</i>	
WA5-3	Perspective and strategies for clinically applicable catheter robot	81
	<i>Jaesoon Choi(Asan Medical Center / University of Ulsan College of Medicine, Korea)</i>	

WA6 [Mini] Control System Design: SICE-ICROS Joint Session I

Udo, 10:20~11:50

WA6-1	Practicality and Performance Improvement of Time-delay Control	83
	<i>Jaemin Baek, Wookyong Kwon(POSTECH, Korea), Soohye Han(POSTEC, Korea)</i>	
WA6-2	Robust Control of Uncertain Robot Manipulator with a Momentum-based Disturbance Observer	87
	<i>Juhoon Back, Wonseok Ha(Kwangwoon University, Korea)</i>	
WA6-3	Multiple Object Center Point Estimation by Fusing SIFT Algorithm and Monte	91

Carlo Method for Multiple Visual Servoing System

Seon Ho Park(Pusan National University, Korea), *Byeong-Chan Choi*, *Jin-Uk Bang*, *Ha-Neul Yun*(Pusan National University, Korea), *Jang Myung Lee*(Pusan National University, Korea)

WA6-4	Continuous-time I-PD Gain Tuning Based on VRFT Using Closed-loop Step Response Data	97
	<i>Jongho Park</i> , <i>Shiro Masuda</i> (Tokyo Metropolitan University, Japan)	
WA6-5	Primal Formulation of Parallel Model Predictive Control	99
	<i>Naoyuki Hara</i> , <i>Keiji Konishi</i> (Osaka Prefecture University, Japan)	
WA6-6	Twin-motor System Using a Data-driven Dual-rate Control	104
	<i>Sho Ito</i> , <i>Natsuki Kawaguchi</i> , <i>Takao Sato</i> , <i>Nozomu Araki</i> , <i>Yasuo Konishi</i> (University of Hyogo, Japan)	

WA7 [Mini] Recent Advances in Control Theory and Industrial Applications I

Tamna, 10:20~11:50

WA7-1	Global consensus of heterogeneous agents with input saturation	106
	<i>Young-Hun Lim</i> (Gyeongnam National University of Science and Technology, Korea), <i>Jin-Hee Son</i> , <i>Hyo-Sung Ahn</i> (Gwangju Institute of Science and Technology (GIST), Korea)	
WA7-2	Rigidity of Distance-based Formations with Additional Subtended-angle Constraints	111
	<i>Myoung-Chul Park</i> (Agency for Defense Development, Korea), <i>Hong Kyong Kim</i> , <i>Hyo-Sung Ahn</i> (Gwangju Institute of Science and Technology (GIST), Korea)	
WA7-3	A New Bearing-Only Navigation Law	117
	<i>Minh Hoang Trinh</i> , <i>Viet Hoang Pham</i> , <i>Phuong Huu Hoang</i> , <i>Jin-Hee Son</i> (Gwangju Institute of Science and Technology, Korea), <i>Hyo-Sung Ahn</i> (GIST, Korea)	
WA7-4	Comparison Study of Parallel Operation of Motor Drives	123
	<i>Kwang-Kyo Oh</i> (Korea Institute of Industrial Technology, Korea), <i>Hong-Jun Lee</i> (Gwangju Institute of Science and Technology, Korea)	
WA7-5	Study on Lock-in Thermography using an inverse dynamic system design	129
	<i>Hee Chan Kang</i> , <i>Hwan Hur</i> , <i>Geon Hee Kim</i> , <i>Kye Sung Lee</i> (Korea Basic Science Institute, Korea)	
WA7-6	Consensus of linear time-invariant multi-agent system over multilayer network	133
	<i>Seungjoon Lee</i> , <i>Hyungbo Shim</i> (Seoul National University, Korea)	

WA8 Sensors and Signal Processing I

Halla, 10:20~11:50

WA8-1	Sensor Failure Detection, Identification and Accommodation Using Neural Network and Fuzzy Voter	139
	<i>Seong-Ho Kwon</i> (Gwangju Institute of Science and Technology, Korea), <i>Hyo-Sung Ahn</i> (GIST, Korea)	
WA8-2	Sensor Security Index for Control Systems	145
	<i>Heegyun Jeon</i> , <i>Yongsoon Eun</i> (DGIST, Korea)	
WA8-3	Sensor Attack Detection for Railway Vehicles using Topographic Information	149
	<i>Buyeon Yu</i> , <i>Yongsoon Eun</i> (DGIST, Korea)	
WA8-4	Generic Framework for Hybrid Fault Diagnosis and Health Monitoring of the Tennessee Eastman Process	155
	<i>Khaoula Tidrari</i> , <i>Nizar Chatti</i> , <i>Sylvain Verron</i> , <i>Teodor Tiplica</i> (University of Angers, France)	
WA8-5	Supervision of industrial manipulators using ANFIS system	161
	<i>Yahia Kourd</i> (SOUK AHRAS University, Algeria), <i>Abdel ouahab Ghrieb</i> (Batna 2 University, Algeria), <i>Noureddine Guersi</i> (Annaba University, Algeria)	

WA8-6	Acoustic Vibration Sensor Based on Macro-Bend Coated Fiber For Pipeline Leakage Detection	167
	<i>Kang Shen Ong, Horng Sheng Lin, Wen Hao Png, Chang Hong Pua, Faiz Abdul Rahman(UTAR, Malaysia)</i>	

WB1 Intelligent Control and System Identifications

Ballroom2, 13:10~14:40

WB1-1	H∞ Fuzzy Control of Interval Type-2 Takagi--Sugeno Fuzzy Systems Under Imperfect Premise Matching	172
	<i>Soungwhan Hwang, Jin Bae Park(Yonsei University, Korea), Young Hoon Joo(Kunsan National University, Korea)</i>	
WB1-2	System Identification with Mixed Binary-valued and Precise Measurements	176
	<i>Hang Zhang, Ting Wang, Yanlong Zhao(Chinese Academy of Sciences, China)</i>	
WB1-3	Model Identification of Nonlinear Sputter Processes	182
	<i>Christian Tobias Wölfel, Sven Kockmann, Peter Awakowicz, Jan Lunze(Ruhr-Universität Bochum, Germany)</i>	
WB1-4	Estimation of an uncertain bilinear boundary condition in linear 2x2 hyperbolic systems with application to drilling	188
	<i>Haavard Holta, Henrik Anfinson, Ole Morten Aamo(NTNU, Norway)</i>	
WB1-5	An Approach for System Identification in Unmanned Surface Vehicles	194
	<i>Izzet Kagan Erunsal, Kenan Ahiska(ASELSAN Inc., Turkey), Murat Kumru, Mehmet Kemal Leblebicioglu(Middle East Technical University, Turkey)</i>	

WB2 Autonomous Vehicle Systems II

Ballroom3, 13:10~14:40

WB2-1	Leader-Following Formation Control of Nonholonomic Robots with Switching Network Topologies	200
	<i>Arslan Safdar, Muwahida Liaquat, Waqar Ali, Faiza Nawaz(National University of Sciences and Technology, Pakistan)</i>	
WB2-2	Object Tracking With A Robotic Manipulator Mounted On Ground Vehicle Using Image Based Visual Servoing	206
	<i>Muhammad Ahsan Sami(National University of Science and Technology, Pakistan), Muhammad Umar Masood, Muhammad Waqar, Muhammad Mujtaba, Abraham Ali Shah, Adnan Shujah, Nasir Rashid, Mohsin Islam Tiwana, Javaid Iqbal(National University of Science and Technology, Islamabad, Pakistan)</i>	
WB2-3	Design and Development of a Semi-Autonomous Stair Climbing Robotic Platform For Rough Terrains	212
	<i>Muhammad Umar Masood, Muhammad Ahsan Sami, Haris Sohail, Muhammad Mujtaba, Abubakar Siddique, Hashir Akram, Nasir Rashid, Mohsin Islam Tiwana, Javaid Iqbal(College of EME, National University of Sciences and Technology, Islamabad, Pakistan)</i>	
WB2-4	A Novel Offline Coverage Path Planning Algorithm for A Tethered Robot	218
	<i>Bigumjith Dias, Sajeev Mechsy, Wijeratnam Pragithmukar, Asitha Kulasekera(University of Moratuwa, Sri Lanka)</i>	
WB2-5	3D Pose Tracking for GPS-denied Terrain Rovers by Fast State Variable Extension and Enhanced Motion Model	224
	<i>Nilesh Suriyarachchi, Peshala Gehan Jayasekara(University of Moratuwa, Sri Lanka), Takashi Kubota(Japan Aerospace eXploration Agency (JAXA), Japan)</i>	
WB2-6	A finite-time convergence of generalized acyclic persistent formation in 3-D	230

using relative position measurements

Viet Hoang Pham, Minh Hoang Trinh(Gwangju Institute of Science and Technology, Korea), Hyung-Ahn Sung(GIST, Korea)

WB3 [Mini] Machine Vision and Its Applications II

Ballroom4, 13:10~14:40

- | | | |
|-------|--|-----|
| WB3-1 | Local Group Relationship Analysis for Group Activity Recognition
<i>Dong-Gyu Lee, Pil-Soo Kim, Seong-Whan Lee(Korea University, Korea)</i> | 236 |
| WB3-2 | Real-time Scheme for 3-Dimensional Localizing and Tracking of People in Multiple Camera Settings
<i>Moonsub Byeon, Sangdoon Yun, Yongmin Ro, Daeung Jo, Kikyung Kim, Jin Young Choi(Seoul National University, Korea)</i> | 239 |
| WB3-3 | Improving Person Re-identification via Pose Prior
<i>Yeong-Jun Cho, Kuk-Jin Yoon(GIST, Korea)</i> | 245 |

WB4 [Mini] Translational Rehabilitation Robots II

Mara, 13:10~14:40

- | | | |
|-------|--|-----|
| WB4-1 | Development of a Rehabilitative System using a Ceiling-Rail Platform for the Independent Walking and Postural Training of Hemiplegic Patients
<i>Kyong Kim(Chungbuk Provincial University, Korea), Jae-Jun Kim, Jae-Nam Kim(CAMTIC Advanced Mechatronics Technology Institute for Commercialization, Korea), Seong-Hyun Kim(Chungbuk Provincial University, Korea), Won-Kyung Song(Korea National Rehabilitation Center, Korea), Wu-Suk Chong(CAMTIC Advanced Mechatronics Technology Institute for Commercialization, Korea)</i> | 247 |
| WB4-2 | Clinical Research on LE Rehabilitation Robots -The Effects of Exoskeleton Overground Gait Assist Robot (Exowalk®, HMM Co. Ltd, Korea) in Stroke Patients
<i>Bumsun Kwon, Yeongyo Nam(Dongguk University Hospital, Korea), Jinwon Lee(HMM Co. Ltd, Korea)</i> | 249 |
| WB4-3 | Reach Task Exercise for Chronic Stroke Survivors using Upper Extremity Rehabilitation Robot
<i>Won-Kyung Song, Ki-Hun Cho(National Rehabilitation Center, Korea)</i> | 253 |
| WB4-4 | 3D Upper Limb Multi-Joint/DOF Mechanical Impedance Estimation
<i>Sang Hoon Kang, Hyunkyeong Jo(UNIST, Korea)</i> | 254 |

WB5 [Mini] Robotics and Image Guide Technologies for Cardiovascular Intervention II

Biyang 13:10~14:40

- | | | |
|-------|---|-----|
| WB5-1 | CT and Angiogram Images Phase Agreement of Coronary Artery through Non-Rigid Registration
<i>Jinwon Son, Siyeop Yoon, Deukhee Lee(Korea Institute of Science and Technology, Korea)</i> | 256 |
| WB5-2 | Study on the manufacturing process of single lumen tube using TPE
<i>Woojin Kim, Sookhee Ku, Jin-Seok Jang(Korea Institute of Industrial Technology, Korea)</i> | 259 |
| WB5-3 | Augmented reality based cannula guide system for interventional cardiology procedures
<i>Ik-gyu Jang(Gumi Electronics & Information Technology Research Institute, Korea)</i> | 261 |
| WB5-4 | Review of electroanatomic mapping systems and technologies
<i>Zhenkai Hu(Asan Medical Center, Korea), Jaesoon Choi(Asan Medical Center / University of Ulsan College of Medicine, Korea)</i> | 264 |

WB7 [Mini] Recent Advances in Control Theory and Industrial Applications II

Tamna, 13:10~14:40

WB7-1	Distributed learning in a multi-agent potential game <i>Chuong Van Nguyen, Phuong Huu Hoang(Gwangju Institute of Science and Technology, Korea), Hong-Kyong Kim, Hyo-Sung Ahn(GIST, Korea)</i>	266
WB7-2	Electromagnetic Pump in Sodium Thermal-Hydraulic Test Facility: Design and Control Issues <i>Byeongyeon Kim, Jiyoung Jeong(Korea Atomic Energy Research Institute, Korea)</i>	272
WB7-3	Design and kinematic analysis of 5-DOF Stage using parallel mechanism <i>Sang-Chul Lee, Jongman Jeong, Jin-Gyu Kim(Korea Basic Science Institute (KBSI), Korea)</i>	276
WB7-4	A Brief Survey of Sensors for Detect, Sense, and Avoid Operations of Small Unmanned Aerial Vehicles <i>Ji-Hwan Son(ETRI, Korea)</i>	279
WB7-5	Consensus under Misaligned Orientations <i>Hyo-Sung Ahn, Minh Hoang Trinh, Byung-Hun Lee(GIST, Korea)</i>	283
WB7-6	A Practical Distributed Mobile Network Protocol and Its Application to Drone Formation Control <i>Junwoo Son, Soohee Han(Pohang University of Science and Technology (POSTECH), Korea)</i>	289

WB8 Sensors and Signal Processing II

Halla, 13:10~14:40

WB8-1	3-D Shape Recovery from Image Focus Using no-reference sharpness metric based on inherent sharpness <i>Fahad Mahmood(National University of Sciences and Technology, Pakistan), Muhammad Tariq Mahmood(Korea University of Technology and Education, Korea), Javaid Iqbal(National University of Sciences and Technology, Pakistan)</i>	295
WB8-2	Saline Solution Concentration Measurement Based on Contact Angle Approach <i>Bhanupol Klongratog, Anupong Srongprapa, Padet Mannaramit(King Mongkut's Institute of Technology Ladkrabang, Thailand), Mongkol Leelaphaiboon(Rajamangala University of Technology Isan, Thailand)</i>	301
WB8-3	Capacitive Measuring of Crude Palm Oil–Water Mixture <i>Pongsakun Sripant, Anupong Srongprapa, Bhanupol Klongratog(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	306
WB8-4	A Versatile Interface Circuit for Capacitive and Resistive Sensors <i>Wandee Petchmaneelumka, Pitsini Mano, Tanatat Wutikun, Vanchai Riewruja(Faculty of Engineering, King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	310
WB8-5	Op-Amps Based Schmitt Trigger with Controllable Threshold Voltage and Its Application to Voltage-to-Period Converter <i>Apinai Rerkratn(King Mongkut's Institute of Technology Ladkrabang, Thailand), Anucha Kaewpoonsuk(Naresuan University, Thailand)</i>	314
WB8-6	Improve Efficiency Multi-Turn Magnetic Encoder that uses Gear System <i>JaeWan Park, Ha Xuan Nguyen, Thuong Ngoc-Cong Tran, Jae Wook Jeon(Sungkyunkwan University, Viet Nam)</i>	318

WC1 Intelligent Systems

WC1-1	Preliminary Test of Affective Virtual Reality Scenes with Head Mount Display for Emotion Elicitation Experiment	325
	<i>Kenta Hidaka, Haoyu Qin, Jun Kobayashi(Kyushu Institute of Technology, Japan)</i>	
WC1-2	Design of Virtual Platoon Control System using Augmented Reality to Assist Welfare Vehicle Users	330
	<i>Ryota Kimura, Nobutomo Matsunaga, Hiroshi Okajima, Gou Koutaki(Kumamoto university, Japan)</i>	
WC1-3	Exploring Response Time Delays of the Cloud-Based Web Services	336
	<i>Nurzhan Omarov(Kazakh University of Railways and Communications, Kazakhstan), Bakhytzhan Omarov(Khoja Akhmet Yassawi International Kazakh-Turkish University, Kazakhstan)</i>	
WC1-4	Traffic of the Communities around Higher Education Service areas in Bangkok Metropolitan, Thailand	341
	<i>Pastraporn Thipayasothon, Amornchai Chaichana(King Mongkut's Institute of Technology Ladkrabang, Thailand), Jintana Nokyoo(King Mongkut's Institute of Technology, Thailand)</i>	
WC1-5	Feature-Point Extraction Based on an Improved SIFT Algorithm	345
	<i>HyunBin Joo(SungKyunKwan University, Korea), Jae Wook Jeon(Sungkyunkwan University, Korea)</i>	
WC1-6	Extraction of GGO regions from chest CT images using deep learning	351
	<i>Kazuki Hirayama, Noriaki Miyake, Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan), Rie Tachibana(National Institute of Technology, Oshima College, Japan), Yasushi Hirano, Shoji Kido(Yamaguchi University, Japan)</i>	

WC2 Autonomous Vehicle Systems III

WC2-1	Design and Development of an Automated Battery Swapping and Charging Station for Multirotor Aerial Vehicles	356
	<i>Chamara Wijaya Bandara Herath(University of Moratuwa, Sri Lanka), Oscar De Silva(Memorial University of Newfoundland, Canada), Damith Suresh Chathuranga, Thilina Dulantha Lalitharatne(University of Moratuwa, Sri Lanka)</i>	
WC2-2	Vision based Autonomous Landing of an Unmanned Aerial Vehicle on a Stationary Target	362
	<i>Vidya Sudevan, Amit Shukla, Hamad Karki(THE PETROLEUM INSTITUTE, United Arab Emirates)</i>	
WC2-3	Variant PID Controller Design for Autonomous Visual Tracking of Oil and Gas Pipelines via an Unmanned Aerial Vehicle	368
	<i>Xiaoqian Huang, Hamad Karki, Amit Shukla, Xiaoxiong Zhang(The Petroleum Institute, United Arab Emirates)</i>	
WC2-4	Optimal Control-Based UAV Path Planning with Dynamically-Constrained TSP with Neighborhoods	373
	<i>Dae-Sung Jang(Alabama A&M University, NASA Ames Research Center, United States), Hyeok-Joo Chae, Han-Lim Choi(KAIST, Korea)</i>	
WC2-5	Design of a Tracking Filter Suitable for 2D Motion Dynamics of an Off-Road Target	379
	<i>Kangwagye Samuel(Pusan National University, Korea)</i>	

WC3 Energy and Transportation Systems

WC3-1	Multi-Objective Optimal Operation with Demand Management and Voltage Stability	383
	<i>Masahiro Furukakoi, Mohammad Masih Sediqi(University of the Ryukyus, Japan), Shantanu</i>	

Chakraborty(Centrum Wiskunde and Informatica, Netherlands), Mohamed Ahmed Moustafa Hassan(Cairo University, Egypt), Tomonobu Senjyu(University of the Ryukyus, Japan)

WC3-2	Real Time Traffic Control System Using Wavelet Neural Networks Signal for Wireless Communication Technology of Future High Speed Railways Performance in Thailand with Intelligent Transportation Systems <i>Prapaipan Salitula, Chamni Jaipradidtham(Kasem Bundit University, Thailand)</i>	389
WC3-3	Study on the Innovation Efficiency of China's High - tech Industry Considering the Enterprise Nature <i>Li Qian, Wenping Wang(Southeast University, China), Renqiao Xiao(Anhui University of Finance and Economics, China)</i>	395
WC3-4	Fuzzy Logic based Building Energy and Comfort Management <i>Balnur Kenjaeva, Bakhytzhhan Omarov(A. Yasawi International Kazakh-Turkish University, Kazakhstan)</i>	400

WC4 [OS] Wearable Robots for Assistance of Activities of Daily Living

Mara, 16:10~17:40

WC4-1	Joint Moment Estimation of a Lower Limb Werable Robot <i>Hyunjin Choi(SG Robotics, Korea)</i>	406
WC4-2	Recent Advances in Wearable Robotics <i>Kyoungchul Kong(Sogang University, Korea)</i>	407
WC4-3	Zero-Impedance Control of ANGELEGS, a Wearable Robot for Patients with Partially Impaired Walking Ability <i>Jangmok Lee, Kyoungchul Kong(Sogang University, Korea)</i>	408
WC4-4	Joint Trajectory Generation and Motion Control of a Wearable Robot for Complete Paraplegics based on Forward Inflection Walking <i>Jungsu Choi, Byeonghun Na, Pyeong-Gook Jung(Sogang University, Korea), Dong-wook Rha(Yonsei University College of Medicine, Korea), Kyoungchul Kong(Sogang University, Korea)</i>	410
WC4-5	Twisted String Actuation Mechanism with an Improved Linearity in Speed Reduction Ratio <i>Minkyu Choi, Yeongsik Seo, Seungho Youn, Kyoungchul Kong(Sogang University, Korea)</i>	412
WC4-6	An Algorithm for Improving the Accuracy of Ground Reaction Force Measured by an Insole-type Sensor System <i>Kanghyun Kim, Kyoungchul Kong(Sogang University, Korea)</i>	414

WC5 [OS] Advances in Cable Driven Parallel Robot System and its Potential Application

Biyang 16:10~17:40

WC5-1	Adaptive control for cable driven parallel robots <i>Jonghyun Yoon(Hanyang univ., Korea), Jong Hyron Park(Hanyang Univ., Korea)</i>	416
WC5-2	The integrated elasto-plastic cable modeling for cable driven parallel robots(CDPRs) <i>Sung-Hyun Choi, Kyoung-Su Park(Gachon university, Korea)</i>	420
WC5-3	Development of a High Payload Cable-Driven Parallel Robot <i>Jinlong Piao, XueJun Jin, Jinwoo Jung, Eunpyo Choi, Jong-Oh Park, Chang-Sei Kim(Chonnam National University, Korea)</i>	423
WC5-4	Development of an Extensible Back-Heating Parallel Cable Robot <i>Jinwoo Jung, Jinlong Piao, XueJun Jin(Chonnam National University, Korea), Jae Wook Park(Daewoo Shipbuilding & Marine Engineering Co., Ltd., Korea), Seong Yeop Kim(Daewoo Shipbuilding & Marine Engineering Co., Ltd, Korea), Jong-Sik Woo(Daewoo Shipbuilding & Marine</i>	426

WC5-5	Black-Box Accuracy Compensation for a Cable-Driven Parallel Robot	428
	<i>Valentin Schmidt, Werner Kraus, Christoph Martin(Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Germany), Xuejun Jin(Chonnam national university, Korea), Anderas Pott(Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Korea)</i>	

WC7 Linear and Nonlinear Control I

Tamna, 16:10~17:40

WC7-1	Analysis on Stability for Generalized Neural Networks with Time-Varying Delays via Second-Order Orthogonal Polynomials-Based Integral Inequality	432
	<i>Seok Young Lee, Min Su Kim, Chaneun Park, Poogyeon Park(POSTECH, Korea)</i>	
WC7-2	A study on the I1 analysis of discrete-time systems	437
	<i>Jung Hoon Kim(Korea Institute of Science and Technology, Korea), Ji-Hyun Park(Korea Institute of Robot and Convergence, Korea)</i>	
WC7-3	Design of an Energy-based Controller for a 2D Ball Segway	442
	<i>Do Van Thach, Pham Dinh Ba, Soon-Geul Lee(Kyung Hee University, Korea)</i>	
WC7-4	On dynamic output-feedback control for uncertain singular Markovian jump system: LMI approach	447
	<i>In Seok Park, Nam Kyu Kwon, Poogyeon Park(POSTECH, Korea)</i>	
WC7-5	Remarks on stability robustness of linear quadratic regulators	452
	<i>Yoonsoo Kim(Gyeongsang National University, Korea)</i>	
WC7-6	A design method of preview controller for linear continuous-time systems with multiple input delays	454
	<i>Yonglong Liao, Fucheng Liao(University of Science and Technology Beijing, China)</i>	

WC8 Mechatronics and Automation

Halla, 16:10~17:40

WC8-1	Mechatronic Architecture Development of UX-1	460
	<i>Soheil Zavari, Olli Usenius, Tuomas Salomaa, Jose Villa Escusol, Arttu Heininen, Jussi Aaltonen, Kari Koskinen(tampere university of technology, Finland)</i>	
WC8-2	Coarse Alignment of Lunar Exploration Rover Using Accelerometer and Sun Sensor	465
	<i>Jaehyuck Cha, Sejong Heo, Chan Gook Park(Seoul National University, Korea)</i>	
WC8-3	Enabling an Automation Architecture of CPPs based on UML combined with IEC-61499	471
	<i>Marcelo V Garcia(Basque Country University, Spain), Carlos A García, Esteban X Castellanos(Universidad Fuerzas Armadas - ESPE, Ecuador), Cesar Rosero, Carlos Sanchez(Universidad Tecnica de Ambato, Ecuador)</i>	
WC8-4	Path planning for remotely controlled UAVs using Gaussian process filter	477
	<i>Jaehyun Yoo(KTH Royal institute of technology, Sweden), H. Jin Kim(Seoul National Univ, Korea), Karl H. Johansson(KTH Royal institute of technology, Sweden)</i>	
WC8-5	Validation of CAN-CAN Gateway in the Automotive Network System	483
	<i>Junwon Kim, KeyHo Kwon(Sungkyunkwan University, Korea)</i>	
WC8-6	Comparison of IEEE802 and AVB in multi switch Environment in Embedded system	489
	<i>JungHwan Seo, Jaewook Jeon(Sungkyunkwan University, Korea)</i>	

TA1 Information and Intelligent Systems

Ballroom2, 10:20~11:50

TA1-1	Real time Depth Measurement using FPGA <i>DaJin Lee</i> (Sungkyunkwan University, Korea), <i>HyunBin Joo</i> (SungKyunKwan University, Korea), <i>Jae Wook Jeon</i> (Sungkyunkwan University, Korea)	494
TA1-2	Correlation and Interdependence Structure in Stock Market : Based on Information Theory and Complex Networks <i>He Jianmin</i> , <i>Jin Wang</i> (southeast university, China)	498
TA1-3	Adaptive Regulation of Sampling Rates for Power Efficient Embedded Control System Design <i>Rajorshee Raha</i> (Indian Institute of Technology Kharagpur, India)	505
TA1-4	RSSI-Based Indoor Localization System with Access Points Selection Method <i>Li Dunghan</i> (WASEDA UNIVERSITY, Japan), <i>Shigeyuki Tateno</i> (Waseda University, Japan), <i>Cho Yitong</i> (WASEDA UNIVERSITY, Japan)	511
TA1-5	Representation of Thai Character Features with Impulse Response of FIR System <i>Kaset Sirisantisamrid</i> (King Mongkut's Institute of Technology Ladkrabang, Thailand)	517
TA1-6	PLC-based Industrial Temperature Controller with Different Response Times <i>Vittaya Tipsuwanporn</i> , <i>Arhit Srimuang</i> (King Mongkut's Institute of Technology Ladkrabang, Thailand)	522

TA2 Industrial Applications of Control I

Ballroom3, 10:20~11:50

TA2-1	Analysis of CAN FD to CAN message routing method for CAN FD and CAN Gateway <i>Hyun Su An</i> , <i>Jae Wook Jeon</i> (SungKyunKwan University, Korea)	528
TA2-2	Loop Shaping Technique for Control Design of Electrical Power Steering System <i>Dongwook Lee</i> , <i>Kyung-Soo Kim</i> , <i>Soohyun Kim</i> (KAIST, Korea)	534
TA2-3	Build-up of customized test automation solutions for efficient verification of chassis systems in vehicle HILS <i>Jae Hoon Lim</i> , <i>Jae Jeong Kim</i> (Hyundai Autron Ltd, Korea)	540
TA2-4	A Cylindrical Magnetic Levitation Stage for High-Precision Rotations <i>Jeong-Woo Jeon</i> , <i>Jong-Moon Kim</i> (Korea Electrotechnology Research Institute, Korea)	545
TA2-5	Modeling and Simulation of Gas Turbine Engine Based on Object-oriented Approach <i>Xiaobo Zhang</i> (Northwestern Polytechnical University, China)	551
TA2-6	Optimization on Turbofan Cycle Parameter Based on Improved Differential Evolution Algorithm <i>Xiaobo Zhang</i> (Northwestern Polytechnical University, China)	556

TA3 Control Applications I

Ballroom4, 10:20~11:50

TA3-1	Data-driven Feedforward Control on Active Vibration Isolation System <i>Zhulin Zhang</i> , <i>Wensheng Yin</i> (Tsinghua University, China)	562
TA3-2	The European Vulnerable Option Pricing Based on Jump-Diffusion Process in Fractional Market <i>Chao Wang</i> , <i>Jianmin He</i> (Southeast University, China)	568

TA3-3	Adaptive Backstepping Control of Single Chamber Microbial Fuel Cell <i>Ravi Mukeshbhai Patel, Dipankar Deb(Institute of Infrastructure Technology, Research And Management, India)</i>	574
TA3-4	Radial Basis Function Neural Network Based PID Control for Quad-rotor Flying Robot <i>Shoji Furukawa, Hun-ok Lim(University, Japan)</i>	580
TA3-5	Non-Linear Fuzzy- PID Controller Design for Track Following of Hard Disk Drive Servo System <i>Vittaya Tipsuwanporn(King Mongkut's Institute of Technology Ladkrabang, Thailand), Vichipon Boonpranchoo, Arjin Numsomran(Faculty of Engineering, King Mongkut's Institute of, Thailand), P. Chaiyasith(Faculty of Science,King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	585

TA4 [Mini] Medical Robots and Simulation I

Mara, 10:20~11:50

TA4-1	Stereo Endoscope System and Master Interface for Continuous Surgical Operation in Laparoscopic Surgical Robot System <i>Nhayoung Hong, Myungjoon Kim, Sungwan Kim(Seoul National University, Korea)</i>	591
TA4-2	Robots for Interventional Procedures <i>Jaesoon Choi(Asan Medical Center / University of Ulsan College of Medicine, Korea)</i>	593
TA4-3	Electromagnetically Actuated Microrobots using Temperature/pH Responsive Hydrogels <i>Gwangjun Go, Hao Li, Jong-Oh Park(Chonnam National University, Korea), Sukho Park(DGIST, Korea)</i>	595
TA4-4	Surgical Navigation using Augmented Reality <i>Jaesung Hong(DGIST, Korea)</i>	597
TA4-5	Medical Simulation <i>Doo Yong Lee(KAIST, Korea)</i>	599

TA5 [Mini] Technologies for the Personal Care Robot Safety I

Biyang 10:20~11:50

TA5-1	A new concept suggestion for maneuvering the self-balancing personal mobility : ATD for human-like behavior <i>Jong-Hyeok Park, Kwan-Woong Gwak(Sejong University, Korea)</i>	600
TA5-2	Parameter estimation for two-wheeled self-balancing personal mobility : preliminary results <i>SooYong Yun, Jong-Hyeok Park, Kwan-Woong Gwak(Sejong University, Korea)</i>	602
TA5-3	Comparative study for the effectiveness of ATD configurations for personal mobility : prismatic vs. rotary <i>LeeJu Choi, Jong-Hyeok Park, Kwan-Woong Gwak(Sejong University, Korea)</i>	604
TA5-4	System design of person carrier robot <i>Youngjae Yun, Donghyeon Seo, Donghan Kim(Kyung Hee University, Korea)</i>	606
TA5-5	A Proposal on Determination of Protective Stop Space of Mobile Servant Robots for ISO13482 <i>Donghyung Kim, Myoungchan Roh, Ji Sung Lee, Bumsoo Seo, Young Sook Jeoung(ETRI, Korea)</i>	608

TA6 [OS] ECTI-ICROS Joint Session on Advances of Control System Design

Udo, 10:15~12:00

TA6-1	OctoMap-Based Coverage Path Planning for Inspection of 3D Structures <i>Hyun Myung, <u>Sungwook Jung</u>, Seungwon Song(KAIST, Korea)</i>	614
TA6-2	Line-up Formation Control of Intelligent Traffic Cones <i><u>Seul Jung</u>, Hyun Lee(Chungnam National University, Korea)</i>	616
TA6-3	Mechanism Design and Impedance Control of Series Elastic Actuator Driven Bi-articular Robotic Arm <i><u>Chan Lee</u>, Sehoon Oh(DGIST, Korea)</i>	619
TA6-4	Evaluation of Explicit Model Predictive Temperature Control for On-off Air Conditioner <i>Abdulhafiz Chesof, <u>Sungwan Boksuwan</u>, Sumit Panaudomsup, Thepjit Cheypoca(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	621
TA6-5	Design of Model Predictive Control for Industrial Process with Input Time Delay <i>Pornthiwa Choomkasien, <u>Peerawat Chomphooyod</u>, David Banjerdpongchai(Chulalongkorn University, Thailand)</i>	625
TA6-6	Petri Net Modeling for Performance Analysis of FF-Based Process Control in Terms of Safety and Availability Enhancement <i>Thaksin Sangsuwan(King Mongkut's University of Technology North Bangkok, Thailand), Nopthawach Whatphat(King Mongkut's Institute of Technology Ladkrabang, Thailand), Jirasak Chanwutitum(King Mongkut's University of Technology North Bangkok, Thailand), Teerawat Thepmanee(King Mongkut's Institute of Technology Ladkrabang, Thailand), <u>Amphawan Julsereewong</u>(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	631
TA6-7	Safety Instrumented System Design in Consideration of Cost-Benefit Analysis : A Case Study of Tail Gas Treating Process <i><u>Teerawat Thepmanee</u>(King Mongkut's Institute of Technology Ladkrabang, Thailand), Amphawan Julsereewong(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	637

TA7 Linear and Nonlinear Control II

Tamna, 10:20~11:50

TA7-1	State estimation for switched systems with nonlinear disturbances under arbitrary switching via generalized Gronwall-Bellman inequality <i><u>Yazhou Tian</u>, Yuangong Sun(University of Jinan, China), Fanwei Meng(Qufu Normal University, China)</i>	643
TA7-2	Reset Control of Nonlinear Chaotic Systems Using Describing Function <i><u>Masataka Iwai</u>(MHI Nuclear Systems and Solution Engineering Co.,Ltd., Japan)</i>	647
TA7-3	Residual Load Sway Reduction Control in Double-pendulum Overhead Cranes Using Motion Trajectory Based on Adams-Matlab Joint Simulation <i><u>Jinxin Hu</u>, Huimin Ouyang, Wenwei Huang, Ping Xing, Chunmin Yu, Guangming Zhang, Lei Mei, Xin Deng, Deming Wang(Nanjing Tech University Nanjing, China)</i>	650
TA7-4	Deferrable Energy/Commodity Purchase and Consumption Policy under Stochastic Prices <i><u>Dragan Obradovic</u>(Siemens, Germany)</i>	655
TA7-5	A newborn anti-windup scheme based on state prediction of fractional integrator for variable speed motor <i><u>Sandeep Pandey</u>(VNIT, Nagpur, India, India), Prakash Dwivedi(NIT, Uttarakhand, India), Anjali Junghare(VNIT, Nagpur, India, India)</i>	663

TA8 Biomedical Instruments and Systems

Halla, 10:20~11:50

TA8-1	A tool for the design of DNA base sequences for molecular circuits <i>Yuki Yoshida, Takashi Nakakuki(Kyushu Institute of Technology, Japan)</i>	669
TA8-2	Stability Analysis of Wnt-ERK cellular signalling by using Nyquist Criterion <i>Taisei Hidaka, Takashi Nakakuki(Kyushu Institute of Technology, Japan)</i>	675
TA8-3	Effects of a soft wearable robotic suit on metabolic cost and gait characteristics in healthy young subjects <i>Shanghai Jin(Yanbian University, China), Shijie Guo(Hebei University of Technology, China), Kazunobu Hashimoto(Ningbo Institute of Intelligent Manufacturing Industry, China), Motoji Yamamoto(Kyushu University, Japan)</i>	680
TA8-4	Design for Walking Rehabilitation of a Lower Limb Exoskeleton Based on Interaction Torque <i>Kai-Tai Song, Agus Lesmana(National Chiao Tung University, Taiwan)</i>	685
TA8-5	Designing Self-feeding System for Increasing Independence of Elders and Parkinson People <i>Nguyen Trong Tuan(Ho Chi Minh City University of Technology and Education, Viet Nam), Nguyen Truong Thinh(Ho Chi Minh City University of Technology and Education, Viet Nam)</i>	691

TB1 [OS] Military Application of Intelligent Control and Information System

Ballroom2, 13:10~14:40

TB1-1	A Comparison of Convolutional Object Detectors for Real-time Drone Tracking Using a PTZ Camera <i>Jihun Park, Dae Heo Kim, Young Sook Shin, Sang-ho Lee(Agency of Defense Development, Korea)</i>	696
TB1-2	Learning drone-control actions in surveillance videos <i>Sunyoung Cho, Dae Hoe Kim, Yong Woon Park(Agency for Defense Development, Korea)</i>	700
TB1-3	Optimal Experimental Design Approach for Machine Learning Process <i>Se-Yoon Oh, Hunmin Yang, Sung-Baek Cho(Agency for Defense Development, Korea)</i>	704
TB1-4	Robust path control of an unmanned ground vehicle in rough terrain <i>Jongho Shin, Dong Jun Kwak, Taehyung Lee, Kiho Kwak(Agency for Defense Development, Korea)</i>	706
TB1-5	Incremental Model Learning and Building of Unknown Objects <i>Kiho Kwak, Jihong Min, Seongyong Ahn(Agency for Defense Development, Korea)</i>	711
TB1-6	Nonground objects modeling using cube voxels and texture mapping <i>Phuong Minh Chu, Hieu Trong Nguyen, Seoungjae Cho(Dongguk University-Seoul, Korea), Yong Woon Park(Agency for Defense Development, Korea), Kyungeun Cho(Dongguk University-Seoul, Korea)</i>	717

TB2 [OS] Field Application of Robot Technologies

Ballroom3, 13:10~14:40

TB2-1	Application of SLAM for 3 Dimensional Ground Navigation <i>Nak Yong Ko(Chosun University, Korea), Tae Gyun Kim(GEO1004 Co. Ltd., Korea), Wonkeun Youn, Taesik Kim(Korea Aerospace Research Institute, Korea)</i>	720
TB2-2	Attitude Estimation of an Unmanned Surface Vehicle Using MEMS-AHRS and GNSS <i>Nak Yong Ko(Chosun University, Korea), Seong Ju Lee, Seokki Jeong(Redone Technologies, Korea), Yong Seon Moon(Sunchon National University, Korea), Kyeonghyi Park(Redone Technologies, Korea)</i>	723
TB2-3	Robust Neural Network Control of Neural Synchronization in the Mutually Coupled Network	726

Jung Eun Son, Seoyoung Nam(LG Electronics, Korea)

- TB2-4 [Real-time Air Conditioner Zone Temperature Control by Cascaded Intelligent PI](#) 732
Seoyoung Nam, Jung Eun Son, Nakhoon Kim(LG Electronics, Korea)
- TB2-5 [Object Following Method For A Differential Type Mobile Robot Based on Ultra Wide Band Distance Sensor System](#) 736
Dong Jin Seo, Tae Gyun Kim(Geo1004 Co., Ltd, Korea), Sung Woo Noh(You Friend Co., Ltd, Korea), Hui Hyon Seo(Gwangju Information and Culture Industry Promotion Agency, Korea)

TB3 Control Applications II

Ballroom4, 13:10~14:40

- TB3-1 [The Modification of Yaw Sensor for Length Standard Calibration System](#) 739
Vittaya Tipsuwanporn(King Mongkut's Institute of Technology Ladkrabang, Thailand), Wanchai Chinchusak (Bangkok, Thailand), Arjin Numsomran(King Mongkut's Institute Technology Ladkrabang, Thailand)
- TB3-2 [Applying Audioanalytics for Determining Contingencies](#) 744
Bakhytzhhan Omarov(Khoja Akhmet Yassawi International Kazakh-Turkish University, Kazakhstan)
- TB3-3 [Leak Detection In Pipeline via Sliding Motion](#) 749
Wan Rahiman(Universiti Sains Malaysia, Malaysia)
- TB3-4 [An Application of Nonlinear High-Gain Observer for the n-link Robot Manipulator which has Measurement Noise in a Feedback Control System](#) 755
Muhammad Saad, Muwahida Liaquat(College of Electrical and Mechanical Engineering, NUST, Pakistan)
- TB3-5 [Nonlinear Optimal Control of a 3-D Overhead Crane with Varying Rope Length](#) 760
Quoc Chi Nguyen, Huynh Phi Long Nguyen(Ho Chi Minh City University of Technology, Viet Nam)
- TB3-6 [A PI λ D μ Controller Design for Peltier-Thermoelectric Cooling System](#) 766
Vittaya Tipsuwanporn, Pranai Kungwalrut, Arjin Numsomran, P. Chaiyasith(King Mongkut's Institute of Technology Ladkrabang, Thailand)

TB4 [Mini] Medical Robots and Simulation II

Mara, 13:10~14:40

- TB4-1 [Development of Soft Wearable Hand Rehabilitation Device](#) 771
Hyung-Soon Park, Dong Hyun Kim(KAIST, Korea)
- TB4-2 [Commercialization of Rehabilitation Robots](#) 773
Won-Kyung Song(National Rehabilitation Center, Korea)
- TB4-3 [KIMM Robotic Ankle-Foot Prosthesis for Lower Limb Amputee](#) 775
Hyun Soo Woo, Yongkoo Lee, Jiuk Jung, Jun-Uk Chu, Chang Won Kim(KIMM, Korea)
- TB4-4 [Design and Control of Robotic Orthosis with Cable Differential Mechanism](#) 777
Junho Choi, Jaehwan Park(Korea Institute of Science and Technology, Korea)
- TB4-5 [Development of Brain-Machine Interface Training System for Anthropomorphic Robotic Arm Control](#) 779
Yoon Jae Kim(Seoul National University, Korea), Woo Hyung Lee, Hyung Seok Nam(Seoul National University College of Medicine, Korea), Sungwan Kim(Seoul National University, Korea)

TC1 [OS] Advances in Intelligent Mechatronics

Ballroom2, 16:10~17:40

TC1-1	A Methodology on the Efficiency of Wireless Power Transfer for the Low Power System <i>Young Hwan Lho, Sang Yong Lee(Woosong University, Korea), Jong Dae Kim, Yil-Suk Yang(ETRI, Korea)</i>	781
TC1-2	A Cascaded Model Identification Technique by RLS-Based Monte Carlo Simulation : Application to a Gyroscopic Actuator <i>Sang D. Lee, Seul Jung(Chungnam National University, Korea)</i>	785
TC1-3	Event-based Real-time Optical Flow Estimation <i>Alex Junho Lee, Ayoung Kim(KAIST, Korea)</i>	787
TC1-4	Dynamic Map Management for Vehicle Localization in Large Scale Area <i>Hyungjin Kim, Hyun Myung(KAIST, Korea)</i>	792
TC1-5	Development of Aerial Image Transmitting Sensor Platform for Disaster Site Surveillance <i>Kyukwang Kim, Jieum Hyun, Hyun Myung(KAIST, Korea)</i>	794

TC2 Industrial Applications of Control II

Ballroom3, 16:10~17:40

TC2-1	Maneuverability Evaluation of Skid Steer Welfare Vehicle for Robust Assistance Control with Model Error Compensator <i>Shoichi Sakamoto, Tomoki Tanaka, Hiroshi Okajima(Kumamoto University, Japan), Nobutomo Matsunaga(Kumamoto university, Japan)</i>	797
TC2-2	Demand Response Considering Participation Rate in Smart Grid: Two Level Optimal Management for DisCo and Customers <i>Ryuto Shigenobu(University of the Ryukyus, Japan)</i>	803
TC2-3	Study on Power Control Methodology of the Accelerator Driven Sub-critical Reactor System <i>Yuxin Yang(Talent Exchange Service Centre of Haidian District, China), Zhiwei Zhou, Ting He, Zhenlong Wu(Tsinghua University, China), Donghai Li(Tsinghua Univ, China)</i>	809
TC2-4	Output Feedback Control for Local Power System Stability based on Sum of Square Programming <i>Yong Wan, Hongxing Tian(Nanjing University of Aeronautics and Astronautics, China)</i>	815
TC2-5	Decentralized Control with Neural Network of Cooperative Robot Manipulator For Object Balancing Task on Flat Plate <i>Nattapon Jaisumroum(kmitl.ac.th, Thailand)</i>	819
TC2-6	Stimuli-Induced Equilibrium Point: A Psychological Field Theory Application in Ramp Merging Systems <i>Kendrick Amezcua, Peter Chao Yu Chen(National University of Singapore, Singapore), Weihai Chen, Zheng Zhao(Beihang University, China)</i>	825

TC3 Process Control Systems

Ballroom4, 16:10~17:40

TC3-1	Optimal Design and Operating Conditions of Solid Oxide Fuel Cell based Auxiliary Power Unit Systems According to Cell Characteristics <i>Daewook Kim(Korea Advanced Institute of Science and Technology (KAIST), Korea), Jay H Lee(KAIST, Korea)</i>	831
TC3-2	Supervisory Optimization of the MGT-CCHP System Using Model Predictive Control <i>Yi Zhang, Fan Zhang, Xiao Wu, Junli Zhang, Li Sun, Jiong Shen(Southeast university, China)</i>	836

TC3-3	Chemical Dosing Control for Ultrafiltration Water Treatment System <i>Vittaya Tipsuwanporn, <u>Pranai Kungwalrut</u>, Jutarat Chaoraingern, P. Chaiyasith, Arjin Numsomran(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	842
TC3-4	The Comparison of Two U-shaped Lines with an Individual Variance on some Tasks <i><u>Suthep Varnasilpin</u>(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	846
TC3-5	The Implementation of PI Controller for Evaporative Cooling System in Controlled Environment Greenhouse <i><u>Maitree Thumma</u>(Ratchamangala University of Technology Isan Nakhon Ratchasima, Thailand), Witchupong Wiboonjaroen, Thanat Sooknuan(Ratchamangala University of Technology Isan Nakhonratchasima, Thailand)</i>	852
TC3-6	A Study of Flow-Level Cascade Control with WirelessHARTTM Transmitter using LabVIEW <i>Vittaya Tipsuwanporn, <u>Pongsakorn Somkane</u>(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	856

TC4 Human Robot Interaction

Mara, 16:10~17:40

TC4-1	Admittance Control for Robot Assisted Retinal Vein Micro-Cannulation under Human-Robot Collaborative Mode <i><u>He Zhang</u>(Harbin Institute of Technology, China), Berk Gonenc, Iulian Iordachita(Johns Hopkins University, United States)</i>	862
TC4-2	Critical Contact Pressure and Transferred Energy for Soft Tissue Injury by Blunt Impact in Human-Robot Interaction <i><u>Tatsuo Fujikawa</u>(Japan Automobile Research Institute, Japan), Ryuji Sugiura(Nihon University, Japan), Rie Nishikata(Fukushima Medical University, Japan), Tetsuya Nishimoto(Nihon University, Japan)</i>	867
TC4-3	Response to Assist Torque Failure of Physical-Assistant Robots <i><u>Yoichi Asano</u>, Koji Matsumoto, Hiroyuki Jinbo(Japan Automobile Research Institute, Japan)</i>	873
TC4-4	Does Size Matter in the Speed and Accuracy on Image Identification? <i><u>Kleddao Satcharoen</u>(King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	878
TC4-5	Teleoperation of an UAV by a 6-DOF Parallel Manipulator with Hybrid Mapping for Inspection of Industrial Structures <i><u>Amit Shukla</u>, Hamad Karki(The Petroleum Institute, Abu Dhabi, UAE, United Arab Emirates)</i>	883
TC4-6	Robot Supporting for Deaf and Less Hearing People <i><u>Nguyen Truong Thinh</u>, Tuong Phuoc Tho(HCMC University of Technology and Education, Viet Nam), Tran Thi Thuy Nga(Thu Dau Mot University, Viet Nam)</i>	889

TC5 [Mini] Technologies for the Personal Care Robot Safety II

Biyang 16:10~17:40

TC5-1	Preliminary experimental results for chest compression in mobile robot-human unconstrained-collision <i><u>Ho-Yeon Kim</u>, Jong-Hyeok Park, SooYong Yun, Seungbin Moon, Kwan-Woong Gwak(Sejong University, Korea)</i>	893
TC5-2	Low cost pressure sensor characteristics comparison for pressure sensing in wearable robots-preliminary result <i><u>Chang-Hwan Lee</u>, Sunghoon Kim(Sejong university, Korea), Deukhwan Ahn, Kwan-Woong Gwak(Sejong University, Korea)</i>	896

TC5-3	Low Cost Insole Sensor for Measuring COP in Wearable Robot <i>Sunghoon Kim, Chang-Hwan Lee(Sejong university, Korea), Deukhwan Ahn, Kwan-Woong Gwak(Sejong University, Korea)</i>	898
TC5-4	Design and PID Force Control of the Calibration Equipment for the Precise Calibration of FSR Sensor <i>Deukhwan Ahn(Sejong University, Korea), Chang-Hwan Lee, Sunghoon Kim(Sejong university, Korea), Kwan-Woong Gwak(Sejong University, Korea)</i>	900
TC5-5	Strategy for Ergonomic Safety Design of Personal Care Robots in accordance with ISO 13482 <i>Hyung-Taek Baek, Sang-Jong Lee, Jinwoo Jeon(KIRIA, Korea)</i>	902
TC5-6	A study on the risk investigation and safety of personal care robots <i>Gi en Yu, Seung-Taek Hong, Ki-Yeop Sung, Joon-Ho Seo(Korea Association of Robot industry (KAR), Korea)</i>	904

TC6 Robot Mechanism and Control

Udo, 16:10~17:40

TC6-1	System Design for Autonomous Table Tennis Ball Collecting Robot <i>Gilhyun Ryou(Seoul National University / NAVER LABS, Korea), Seong Ho Yeon(NAVER LABS, Korea), Dayeon Kim(POSTECH / NAVER LABS, Korea), Youngwoo Sim(Seoul National University / NAVER LABS, Korea)</i>	909
TC6-2	Numerical and Practical Experiments of Acceleration-Level Fault-Tolerant Scheme for Redundant Manipulator MPaC <i>Huihui Gong, Ziyu Yin, Dechao Chen, Long Jin, Yunong Zhang(Sun Yat-sen University, China)</i>	915
TC6-3	Adaptive Motion Planning in Bin-Picking with Object Uncertainties <i>Thomas Fridolin Iversen, Lars-Peter Ellekilde(University of Southern Denmark, Denmark), Jaime Valls Miro(University of Technology Sydney, Australia)</i>	921
TC6-4	Development of Wheeled Balancing Wheelchair for Lower Limb Disabled Person: Design of Wheelchair Platform <i>Seonghee Jeong(Osaka Electro-Communication University, Japan)</i>	929

TC7 Adaptive and Robust Control

Tamna, 16:10~17:40

TC7-1	Quick Recovery after Feedback Loss: Delay-Differential Systems <i>Ho-Lim Choi(Dong-A University, Korea), Jacob Hammer(University of Florida, United States)</i>	933
TC7-2	On the H_2 and H_{inf} Performance of Uncertain Positive Systems <i>Maryam Babazadeh(Sharif University of Technology, Iran, Islamic Republic of)</i>	939
TC7-3	Convex Parametrization of H_{inf} Controllers for Positively Dominated Systems <i>Maryam Babazadeh(Sharif University of Technology, Iran, Islamic Republic of)</i>	945
TC7-4	Robust Adaptive Gain for Suppression of Chattering in Sliding Mode Controller <i>Saadi Abbas Alobaidi, Ali Amer ALRawi(Dijlah University College, Iraq), Stevica Graovac (University of Belgrade, Serbia)</i>	951
TC7-5	Robust Variable Stiffness Control of McKibben Type Pneumatic Artificial Muscle Arm by using Multiple Model Error Compensator <i>Yuto Yamamoto, Nobutomo Matsunaga, Hiroshi Okajima(Kumamoto University, Japan)</i>	957
TC7-6	Bottom Hole Pressure Control for Oil Well Drilling using Model Reference Adaptive Control	963

TC8 [OS] Inference, Data Mining, Control and Measurement

Halla, 16:10~17:40

TC8-1	<p>A Consideration of Step Pattern Extraction and Personal Identification from Gait Vibration Data</p> <p><i>Yuichi Nakamura, Hiroto Ikeshita, Tatsuji Tanaka, Tatsuo Hasegawa, Shin Itami(National Institute of Technology, Anan College, Japan), Yohei Saika(National Institute of Technology, Gunma College, Japan), Masahiro Nakagawa(Nagaoka University of Technology, Japan)</i></p>	969
TC8-2	<p>Dynamics of Predicting Temperature-Humidity Index and Power Consumption in Small-scale System Utilizing Bayesian Inference Via the EAP Estimation</p> <p><i>Yohei Saika(Natl.Inst.Tech.GC, Japan), Masahiro Nakagawa(Nagaoka University of Technology, Japan)</i></p>	975
TC8-3	<p>Effects of the Presence of an Audience on Dance Movements: A Trial analysis of male and female dancers</p> <p><i>Nao Shikanai(Japan Women's University, Japan)</i></p>	981
TC8-4	<p>Influence of Wheel--Terrain Contact Point Information Errors on the Accuracy of Three-Dimensional Space Odometry Using Tactile Wheels and Gyros</p> <p><i>Tomoyasu Ichimura, Woong Choi(National Institute of Technology, Gunma College, Japan)</i></p>	985
TC8-5	<p>Compressed Sensing for Phase Unwrapping of Interferometric SAR Data</p> <p><i>Toshiaki Aida(Okayama University, Japan)</i></p>	989
TC8-6	<p>Development of Inter-Vehicle Distance Measurement System using Camera-Equipped Portable Device</p> <p><i>Nobuo Sasaki, Syuhei Tomaru, Shiori Nakamura(National Institute of Technology, Gunma College, Japan)</i></p>	994

TP-B Interactive Poster Session I

2F Lobby, 13:00~14:00

TP-B-1	<p>Real Time Road Lane Detection for Outdoor Autonomous Navigation of Mobile Robot</p> <p><i>Wonje Jang, Minho Cho, Jhonghyun An(Yonsei University, Korea), Euntai Kim(Yonsei Univ., Korea)</i></p>	998
TP-B-2	<p>Deep Learning Based Vehicle and Pedestrian Detection Using Embedded GPU System</p> <p><i>Yeong-Cheol Cho, Hyeon-Seok Kim, Won-Il Son, Min-Gyu Park1, Seung-Woo Kim, Seongkeun Park(Soonchunhyang University, Korea)</i></p>	1000
TP-B-3	<p>Vehicle detection using a laser range finder on the basis of SVDD(Support Vector Data Description)</p> <p><i>Seungho Hyeong, Woojin Chung(Korea University, Korea)</i></p>	1002
TP-B-4	<p>Probabilistic Approach to k-Nearest Neighbor Rule</p> <p><i>Heesung Lee(Korea National University of Transportation, Korea)</i></p>	1004
TP-B-5	<p>Depth-Hybrid Speeded-Up Robust Features</p> <p><i>Hyunjin Kim(KAIST, Korea), Donghwa Lee(Daegu University, Korea), Hyun Myung(KAIST, Korea)</i></p>	1006
TP-B-6	<p>Initial dip-based brain area identification for right-hand finger movement</p> <p><i>Amad Zafar, Muhammad Jawad Khan, Keum-Shik Hong(Pusan National University, Korea)</i></p>	1007
TP-B-7	<p>Utilization of fNIRS signals as feedback for sensory decoding</p> <p><i>Muhammad Raheel Bhutta, Seong-Woo Woo, Sohyeon Yoo, Jongseo Park, Keum-Shik</i></p>	1012

Hong(Pusan National University, Korea)

TP-B-8	Active vibration control of a flexible rod in water	1018
	<i>Umer Hameed Shah, Mingxu Piao, Gyoung-Hahn Kim, Keum-Shik Hong(Pusan National University, Korea)</i>	
TP-B-9	Development of a dual wavelength 32-channel functional near-infrared spectroscopy based neuroimaging system	1024
	<i>M. Atif Yaqub, M. Raheel Bhutta, Jongseo Park, Keum-Shik Hong(Pusan National University, Korea)</i>	
TP-B-10	Learning to Grasp Objects based on Ensemble Learning Combining Simulation Data and Real Data	1030
	<i>Yong-Ho Na, HyunJun Jo, Jae-Bok Song(Korea University, Korea)</i>	
TP-B-11	Data Augmentation using Synthesized Images for Object Detection	1035
	<i>HyunJun Jo(Korea university, Korea), Yong-Ho Na, Jae-Bok Song(Korea University, Korea)</i>	
TP-B-12	Copper Foil Surface Defects Classification Algorithm Based on Convolutional Neural Networks	1039
	<i>Yongsik Jin(Korea Institute of Industrial Technology / Kyungpook National University, Korea), Sangmoon Lee(Kyungpook National University, Korea), Chungki Lee(YUJIN INSTECH CO.,LTD, Korea), Jong Pil Yun(Korea Institute of Industrial Techonlogy, Korea)</i>	
TP-B-13	Recurrent Neural Network Based Lane Change Prediction Using ADAS Sensors and V2X	1041
	<i>Wansik Choi, Changsun Ahn(Pusan National University, Korea)</i>	
TP-B-14	Automatic Age and Gender Classification for Korean	1044
	<i>SeungChul Ha, Jongeun Choi(Yonsei Univ., United States)</i>	
TP-B-15	Lane Detection and Vehicle Localization based on Particle Filter	1046
	<i>Yang Yu, Kang-Hyun Jo(University of Ulsan, Korea)</i>	
TP-B-16	Data Association Approach to Mobile Robot Localization Using Non-Unique Landmarks	1049
	<i>Daniel Hong, Geon Heo, Cheol-Woo Myung, Won-Sang Ra(Handong Global University, Korea)</i>	
TP-B-17	Lane Localizatoin based on Line Fitting	1054
	<i>Hwan Heo, Min-Gyu Park, Youngbae Hwang(Korea Electronics Technology Institute, Korea)</i>	
TP-B-18	Finding efficient paths for multi-robot path coverage	1055
	<i>Hyeun Jeong Min(Yonsei University, Wonju, Korea)</i>	
TP-B-19	PID Control for Formation Flight in Presence of Disturbance	1059
	<i>Rebecca Thien, Yoonsoo Kim(Gyeongsang National University, Korea)</i>	
TP-B-20	Source Seeking of Multi-UAV Based on Extremum Seeking Algorithm	1062
	<i>Shuo Zhuo(Zhejiang University, China)</i>	
TP-B-21	Lennard-Jones Potential Field-based Swarm Systems for aggregation and obstacle avoidance	1068
	<i>Ji-Hwan Son(ETRI, Korea)</i>	
TP-B-22	Integrated Chassis Control of suspension and steering systems for LKAS	1073
	<i>Sungwook Lee, Jahanghyon Park(HANYANG UNIVERSITY, Korea)</i>	
TP-B-23	Sensor Fusion for Vehicle Tracking with Camera and Radar Sensor	1075
	<i>Kyeong-Eun Kim, Changjoo Lee, Dong Sung Pae, Myo Taeg Lim(Korea University, Korea)</i>	
TP-B-24	A Novel Approach to the Enhancement of Lane Estimator by using Kalman Filter	1078
	<i>Moon-Hyung Song, Chang-il Kim, Jong-min Kim, Kwang-soo Lee, Hyun-Bae Park, Jae-soek Jeon, Su-jin Kwag, Moon-sik Kim(Korea Automotive Technology Institute, Korea)</i>	
TP-B-25	A Distributed Coverage Algorithm for Multi-UAV with Average Voronoi Partition	1083
	<i>Sai Chen(Zhejiang University, China)</i>	

TP-B-26	Verification of Energy Model of Solar Powered UAV using Virtual Flight Evaluation <i>Seong-Hwan Kim, Giancarlo Eder Guerra Padilla, Kee-Ho Yu(Chonbuk National University, Korea)</i>	1087
TP-B-27	Implementation of High-Speed Autonomous Driving based on Low cost GPS and NTRIP <i>Minho Lee, Seokhoon Ryu, Sunwung Lee, Kyung Yeop Han, Young-Sup Lee(Incheon National University, Korea)</i>	1091
TP-B-28	UAVs Cooperative Attack Based on Archimedes Spiral <i>LI Zhenming(Zhejiang University, China)</i>	1094
TP-B-29	Traffic light recognition with HUV-histogram from daytime driving-view images. <i>Gyeongmin Bak, Daijin Kim(POSTECH, Korea)</i>	1099
TP-B-30	Auto-Guided Combine Harvester simulation and its Validation test <i>Chan Woo Jeon(Seoul National University, Korea), Hak-Jin Kim(Soul National University, Korea), Xiongzhe Han(Texas A&M Scoates Hall, China), Jung Hun Kim(Tong Yang Moolsan Co, Korea)</i>	1103
TP-B-31	The Smart Wearable Bio Temperature Regulation Sensor for Improving Human Wellness <i>Jong-Ha Lee(Keimyung University School of Medicine, Korea), Hyung Jin Kim(Convergence Medical Device Research Center, Gumi Electronics and Information Technology Research Ins, Korea)</i>	1105
TP-B-32	Automated Extraction of Optic Disc Regions from Fundus Images for Preperimetric Glaucoma Diagnosis <i>Jisang Park, Hyeon Sung Cho, Jae Il Cho(Electronics & Telecommunication Research Institute, Korea)</i>	1107
TP-B-33	Locomotion identification under load and various walking environment using surface electromyography and ground reaction force <i>Won Dong Kim, Seulki Kyeong, Jung Kim(KAIST, Korea)</i>	1111
TP-B-34	Real-time ECG and Respiration Monitoring System in Rehabilitation Robot for Gait training <i>EunKyung Bae, Sang-Eun Park, DongJun Kim(Asan Institute for Life Sciences, Korea), Youngjin Moon(Asan Medical Center & University of Ulsan, Korea), Jaesoon Choi(Asan Medical Center / University of Ulsan College of Medicine, Korea)</i>	1113
TP-B-35	Methods of Selecting Electroencephalographic Features for Personal Authentication <i>Chungho Lee, Jae-Hwan Kang, Sung-phil Kim(UNIST, Korea)</i>	1115
TP-B-36	Study on the Innovation Efficiency of China's High - tech Industry Considering the Enterprise Nature <i>Li Qian, Wen-ping Wang(Southeast University, China), Ren-qiao Xiao(Anhui University of Finance and Economics, China)</i>	1120
TP-B-37	A Study on the Stability of a Trans-admittance Amplifier as Synthetic Admittance for Piezoelectric Shunt Damping <i>Hideyuki Ichiwara, Kentaro Takagi, Toru Ikegame(Nagoya University, Japan)</i>	1125
TP-B-38	Study on Novel Structure and Control of Energy Saving of Hydraulic Hybrid Excavator <i>Yu Yingxiao(University of Ulsan, Korea), Kyoung Kwan Ahn(University of Ulsan, Korea)</i>	1127
TP-B-39	Robust Hydraulic Position Control based on Uncertainty and Disturbance Estimation <i>HeeJee Sung(Pusan National University, Korea), JiHoon Lee(Korea testing Laboratory, Korea), Hyung-Ki Min, Myeong-Kwan Park(Pusan National University, Korea)</i>	1132
TP-B-40	Robust Control of Electro-Hydraulic Load Simulator Using Sliding Mode Control with Perturbation Estimation <i>Hyongki Min, HeeJee Sung(Pusan National University, Korea), Jihoon Lee(Korea testing Laboratory, Korea), MyeongKwan Park(Pusan National University, Korea)</i>	1137

TP-B-41	Operability with Total Steering Wheel Revolution for Electric Control Steering System of Pleasure Boat <i>Kazuya Kawamata, Shigehiro Toyama, Fujio Ikeda(National Institute of Technology, Nagaoka College, Japan)</i>	1142
TP-B-42	A Study on control system of dual turbo blower operating with air-foil bearing <i>Si young Park(Neuros co.,ltd, Korea)</i>	1143
TP-B-43	Backstepping Control for Electro-Hydrostatic Actuation Systems With Mismatched Disturbances Via a Disturbance Observer <i>Hyung-Tae Seo, Yun-Pyo Hong, Jihyuk Park, Kyung-Soo Kim(KAIST, Korea)</i>	1145
TP-B-44	Experiments and Characteristic Analysis of a Large-Capacity Prismatic Cell for Electric-Powered Application <i>Jonghoon Kim(Chungnam National University, Korea)</i>	1148
TP-B-45	A Research on Junction Temperature Measurement of MOSFETs <i>Bum-Su Jun(University of Sungkyunkwan, Korea), Joon Sung Park(Korea Electronics Technology Institute, Korea)</i>	1152
TP-B-46	Current Measurement Module for Inexpensive DC Motor Torque Control System <i>Jun Kobayashi, Tsuyoshi Mori(Kyushu Institute of Technology, Japan)</i>	1153
TP-B-47	Memory Space Adjustable Iterative Learning Controller for Flyback Inverter <i>Hyosin Kim(Pohang University of Science and Technology, Korea), Seok-Min Wi(Department of, Korea), Byeongcheol Han, Sungho Son, Minsung Kim(Pohang University of Science and Technology, Korea)</i>	1155
TP-B-48	Design of Plug-In Repetitive Controller for Unfolding-Type Cuk Inverter <i>Byeongcheol Han, Minsung Kim(Pohang University of Science and Technology, Korea)</i>	1157
TP-B-49	Transient Improvement of Cuk Converter based Fuel-Cell Power Conditioning System <i>Seok-Min Wi, Hyosin Kim, Byeongcheol Han, Sungho Son, Minsung Kim(Pohang University of Science and Technology, Korea)</i>	1159
TP-B-50	Robust Proportional-Type Position Tracking Controller for DC Motor with Disturbance Observers <i>Seok-Kyoon Kim, Young Seok Lee(Hanbat National University, Korea)</i>	1161
TP-B-51	Bounded Control of a Ball and Beam System in the Absence of Feedback <i>Kyung-Tae Lee, Sang-Young Oh, Ho-Lim Choi(Dong-A University, Korea)</i>	1167
TP-B-52	A Switching Action for PID Controller to Improve Trajectory Tracking Performance <i>MyoungHo Kim, SungUk Lee(Korea Atomic Energy Research Institute, Korea)</i>	1170
TP-B-53	Output regulation based rejection of harmonic disturbances in grid tied inverter <i>Jung-Su Kim(SeoulTech, Korea)</i>	1176
TP-B-54	Unambiguity of Delay-and-Multiply Acquisition Method for GPS L1C Signal <i>Duk-Sun Shim, Jin-Seok Jeon(Chung-Ang University, Korea)</i>	1178

TP-C Interactive Poster Session I

2F Lobby, 14:00~15:00

TP-C-1	Global Fast Terminal Sliding Mode Control for Quadrotor UAV <i>Qualid Doukhi, AbdurRazzaq Fayjie, Deok Jin Lee(Kunsan National University, Korea)</i>	1180
TP-C-2	On a Discrete-Time Sliding-Mode Controller for Magnetic Levitation Systems <i>Yoko Uemura, Jun Imai, Akiko Takahashi, Shigeyuki Funabiki(Okayama University, Japan)</i>	1183
TP-C-3	A Study on the Framework Design of Korean-Model PLC-Integrated Drone	1185

	Landing Site in Mountain Regions: A Software Engineering Approach <i>Jun-Ho Huh(Assistant Professor of Dept. of Software, Catholic University of Pusan, Korea), <u>Jeong-Ho Bak</u>(Pukyong National University at Daeyeon, Republic of Korea, Korea)</i>	
TP-C-4	Weighted Moments of Discrete-Time Systems from Experimental Data <i><u>Jiho Hwang</u>, Young Chol Kim(Chungbuk National University, Korea)</i>	1191
TP-C-5	Fuzzy Observer Design and Its Experimental Validation Using the Fuzzy Lyapunov Function <i><u>Hyeon Jun Lim</u>, Jin Bae Park(Yonsei University, Korea), Young Hoon Joo(Kunsan National University, Korea)</i>	1196
TP-C-6	Road Profile Estimation using Inertial Sensors <i><u>Juhui Gim</u>, Changsun Ahn(Pusan National University, Korea)</i>	1201
TP-C-7	Robust and Resilient State Estimation <i><u>Yechan Jeong</u>, Dongmin Seo, Yongsoon Eun(DGIST, Korea)</i>	1204
TP-C-8	Double-loop Control with Proportional-Integral and Partial Feedback Linearization for a 3D Gantry Crane <i>Soon-Geul Lee, <u>Quoc-Dong Hoang</u>, Dinh-Ba Pham(KyungHee University, Korea)</i>	1206
TP-C-9	Extension of Simplified Internal Model Control for Systems with Double Integrators <i><u>Hanbit Lee</u>, Gyujin Na, Yongsoon Eun(DGIST, Korea)</i>	1212
TP-C-10	Multi-Parametric Model Predictive Control for Variable Valve Timing <i><u>Junho Lee</u>, H.-J. Chang(Kookmin University, Korea)</i>	1218
TP-C-11	Exponential decay rate of planar switched positive linear systems <i><u>Wenxiu Zhao</u>, Yuangong Sun(University of Jinan, China)</i>	1222
TP-C-12	Exponential stability of switched time-varying systems with delay and disturbance <i><u>Minmin Zhao</u>, Yuangong Sun(University of Jinan, China)</i>	1226
TP-C-13	Volatility spillover among USA and major East Asian stock indices based on multivariate stochastic volatility with regime-switching model <i><u>Zhang Jing</u>, Zhuang Yaming(Southeast University, China)</i>	1231
TP-C-14	Frequency Response Analysis on Modified Plant of Extended State Observer <i>Yuqiong Zhang(China Electric Power Research Institute, China), Yali Xue, <u>Donghai Li</u>(Tsinghua University, China), Zhiqiang Gao(Cleveland State University, United States), Haiming Niu(Beijing Guodian Zhishen Control Technology Co., Ltd., China), Huanpao Huang(niuhaoming@kh.cgdc.com.cn, China)</i>	1237
TP-C-15	Position and Altitude Control of a Quadcopter using State Dependent Riccati Equation Control <i><u>Mapopa Chipofya</u>(Kunsan National University, Korea)</i>	1242
TP-C-16	A Solution to Optimal Preview Control for Linear Time-Varying Systems <i><u>Kunhee Ryu</u>, Juhoon Back(Kwangwoon University, Korea)</i>	1245
TP-C-17	A Study on Positional Displacement Control for the Pontoon Ribbon Bridges for River-crossing Purpose <i>Youngbok Kim(Pukyong National University, Korea), <u>Van Trong Nguyen</u>(the Graduate School, Pukyong National University, Korea)</i>	1247
TP-C-18	T-S Fuzzy-based Nonlinear DOB using State Observer <i><u>Abner Jr Punsalan Asignacion</u>, Seung Kyu Park, Min Uk Lee(Changwon National University, Korea)</i>	1249
TP-C-19	Modeling of Train Dynamics for Autonomous Operation <i><u>Jaeyeon Park</u>, Buyeon Yu, Seungyeop Lee(DGIST, Korea), Jungtai Kim(Railroad Research Institute, Korea), Kwangsoo Kim(Hanbat National University, Korea), Yongsoon Eun(DGIST, Korea)</i>	1251

TP-C-20	Effect of Zero Mean Sensor Noise On the Dynamics of Linear-Plant-Nonlinear-Instrumentation Feedback Control Systems <i><u>Seyeong Cheon</u>, Juseung Lee, Yirang Shin, Jeyoung Song, Yongsoon Eun(DGIST, Korea)</i>	1252
TP-C-21	Double Line Frequency Ripple Suppression Control for Capacitor-Less Current-Fed Type Converter <i><u>Byeongcheol Han</u>, Changkyu Bai, Minsung Kim(Pohang University of Science and Technology, Korea)</i>	1254
TP-C-22	Nonlinear Digital Control for DC-DC Flyback Converter with Fast Transient Response <i><u>Seok-Min Wi</u>, Hyosin Kim, Sungho Son, Byeongcheol Han, Minsung Kim(Pohang University of Science and Technology, Korea)</i>	1256
TP-C-23	Sliding Mode Control for Second-order Systems with Smooth Input <i><u>ByungYun Jin</u>, Soon-Hong Kwon, Du-Se Lee, Kang Bak Park(Korea University, Korea)</i>	1258
TP-C-24	Chattering-free Integral Sliding Mode Control for Nuclear Reactor Power Tracking Problem in Load-following Scenario <i><u>Sungmoon Joo</u>, Jonghwan Lee, Gee Yong Park(Korea Atomic Energy Research Institute, Korea)</i>	1260
TP-C-25	Feasibility Test Results of an Instantaneous Walking Speed Estimation of the Lower-limb Exoskeleton Robots <i><u>Changhoon Seo</u>(Agency for Defence Development, Korea)</i>	1262
TP-C-26	The effective rehabilitation method realizing various environments in robot assisted gait training <i><u>Minsu Chang</u>(Sogang University, Korea), Doyoung Jeon(Sogang university, Korea)</i>	1264
TP-C-27	A method of specific muscle group training of lower limb using an exoskeletal robot <i><u>Minsu Chang</u>(Sogang University, Korea), Doyoung Jeon(Sogang university, Korea)</i>	1266
TP-C-28	Realization of Virtual Impedance in the Lower Limb Assistive Robot SUBAR <i><u>Yeongmin Kim</u>, Minsu Chang(Sogang University, Korea), Doyoung Jeon(Sogang university, Korea)</i>	1268
TP-C-29	Design of Knee Joint Actuation Module Using Four-bar Linkage Mechanism for Running Exoskeleton <i><u>YoungJune Shin</u>, Byung Un Kim(Agency for Defense Development, Korea)</i>	1270
TP-C-30	A Study on the Effects of Negative Power Assistance on Walking Efficiency Using an Ankle Exoskeleton <i><u>Christian William Bundschu</u>, Kyujin Cho(Seoul National University, Korea)</i>	1272
TP-C-31	Design of Tendon driven SEA(Series Elastic Actuator) based on Bio-mechanical Gait Analysis for a Soft Exo-Suit <i>Hee Don Lee, <u>Tae Hun Kang</u>, Jeon Il Moon(Daegu Gyeongbuk Institute of Science & Technology, Korea)</i>	1274
TP-C-32	Effect of Local-Adaptive Haptic Guidance on a Path-Following Task <i><u>Hee-Seung Moon</u>, Jiwon Seo(Yonsei University, Korea)</i>	1276
TP-C-33	A Study on 3D-Touch Usability on a Large Screen Touch Device <i><u>Jang-yeol Lee</u>, Choon-Sung Nam, Dong-Ryeol Shin(Sungkyunkwan University, Korea)</i>	1281
TP-C-34	Development of Parallel Link Robot for Somatosensory Stimulation <i><u>Yuki Nakamura</u>, Shigehiro Toyama, Fujio Ikeda, Kenji Kamimura(National Institute of Technology, Nagaoka College, Japan), Toshimasa Miyazaki(Nagaoka University of Technology, Japan)</i>	1283
TP-C-35	Operability for Oscillating Motion of Pleasure Boats <i><u>Tomohiro Haryu</u>, Shigehiro Toyama, Kenji Kamimura, Fujio Ikeda(National Institute of Technology, Nagaoka College, Japan)</i>	1285
TP-C-36	Improvement of face recognition performance evaluation technology by using a display device through color adjustment	1287

TP-C-37	Comparison Study of Potential Workload Index in a Simulated Multiple-UAV Operation Environment	1291
	<i>Hyung Jin Lim(Kookmin University, Korea), Seong-Hwan Choi(Gyeongsang National University, Korea), Jangjin Oh, Seongyoung Kim(Chungnam National University, Korea), Ji-Won Lee(Kookmin University, Korea), Byoung Soo Kim(Gyeongsang National University, Korea), Seungkeun Kim(Chungnam National University, Korea), Ji Hyun Yang(Kookmin University, Korea)</i>	
TP-C-38	Requirement Analysis of Simulator-based Integration for Disaster Response Robots	1295
	<i>Kap-Ho Seo(Korea Institute of Robot and Convergence, Korea)</i>	
TP-C-39	Turn-Taking Intention Recognition using Multimodal Cues in Social Human-Robot Interaction	1300
	<i>Cheonshu Park(ETRI, Korea)</i>	
TP-C-40	A Design of Mapping to Represent Human Motion with Humanoid Robot by Singular Value Decomposition	1303
	<i>Ayami Kosaka, Shigehiro Toyama, Fujio Ikeda(National Institute of Technology, Nagaoka College, Japan)</i>	
TP-C-41	Design and Dynamic Analysis of Series Elastic Actuator using Electro-Hydraulic Actuator	1305
	<i>Yongsu Park, Jeon IL Moon, Taehun Kang(Daegu Gyeongbuk Institute of Science and Technology, Korea)</i>	
TP-C-42	A Study on Driving Stability and Visual Fatigue Assessment using Fully Digital Instrument Cluster	1307
	<i>Dongwoon Ryu, Youngdal Oh(KOREA AUTOMOTIVE TECHNOLOGY INSTITUTE, Korea), Sunhong Park(Korea Automotive Technology Institute, Korea)</i>	
TP-C-43	A Diagnostic Function of Lithium Ion Battery Management Systems	1309
	<i>Mirim Ha, Hyun Chul Song(Hanwha Land Systems, Korea)</i>	
TP-C-44	Fault detection and isolation of semi-active system using integrated method	1313
	<i>Wonbin Na, Juin Lee, Hyeongcheol Lee(Hanyang Univ., Korea)</i>	
TP-C-45	Anti-Skid Braking Realization at Wheel-Rail Contact using a Sliding Mode Control Scheme	1318
	<i>Chul-Goo Kang(Konkuk University, Korea), Nam-Jin Lee(Hyundai Rotem, Korea)</i>	
TP-C-46	Maintaining State of Charge Method for Repetitive Driving	1322
	<i>Jinwoo Lee(KAIST, Korea), ByeongChul Sung(Korea Advanced Institute of Science and Technology, Korea), Kyung-Soo Kim, Soohyun Kim(KAIST, Korea)</i>	
TP-C-47	Permanent magnet type and Reluctance type Limited Angle DC Motor for Robust Robot System (ICCAS 2017)	1324
	<i>Eui-Chun Lee, Soon-O Kwon, Ho-Young Lee(Korea Institute of Industrial Technology, Korea), Chang-Ho Kang, Yong-Han Kim(Hanhwa Systems co., Ltd, Korea), Jung-Pyo Hong(Hanyang University, Korea)</i>	
TP-C-48	Development of a Driving Simulator to Acquire Human Reaction Time on Audible Collision Warning	1326
	<i>Changwon Kim, Sejin Kim, Bohyun An(Korea Institute of Machinery and Materials, Korea)</i>	
TP-C-49	Development of A Design Specification and Verification Test Method for Vision-based Oncoming Vehicle Collision Avoidance System	1328
	<i>Jaehyun Mo, Youngjun Lee(Mando Corporation, Korea)</i>	
TP-C-50	MPC based Vehicle Post Impact Stabilization	1330
	<i>YeaYoung Park, Changsun Ahn(Pusan National University, Korea)</i>	
TP-C-51	Fuel-Conscious Velocity Control Strategy for Adaptive Cruise Control	1333

Junyeong Kim, Changsun Ahn(Pusan National University, Korea)

- TP-C-52 [Optimal Parameter Setting of Optical Mouse based Mobile Robot Traveling Simulator](#) 1335
Sungbok Kim, Seyoung Choi(Hankuk University of Foreign Studies, Korea)
- TP-C-53 [Robotic Drilling System for Deep-hole Machining of Automotive Molding](#) 1341
Hee Jin Park, Hyun Ju Lee, Jeon IL Moon(DGIST, Korea), Tae Hun Kang(Daegu Gyeongbuk Institute of Science & Technology, Korea)

FA1 Robot Vision

Ballroom2, 10:20~11:50

- FA1-1 [Exploiting Color Spaces for the task of Foreground Detection](#) 1343
Ajmal Shahbaz, Kang-Hyun Jo(University of Ulsan, Korea)
- FA1-2 [Human fall classification system for ceiling-mounted kinect depth images](#) 1346
Sowmya Kasturi(University of Ulsan, Korea)
- FA1-3 [Real-time Pedestrian Detection Using a Support Vector Machine and Stixel Information](#) 1350
Mi Thi-Tra Nguyen, Vinh Dinh Nguyen, Wook Jae Jeon(Sungkyunkwan University, Korea)
- FA1-4 [Weld line detection algorithm for radiography test of welding beads in a ship piping system](#) 1356
Sang Jun Lee(POSTECH, Korea), Jong Pil Yun(Korea Institute of Industrial Technology (KITECH), Korea), Gyogwon Koo, Hyeyeon Choi, Sang Woo Kim(POSTECH, Korea)
- FA1-5 [Optical flow estimation on the boundary of regions with different velocity](#) 1360
Kosuke Takeuchi, Teruo Yamaguchi, Hiroshi Harada(Kumamoto University, Japan)
- FA1-6 [Finger Motion Estimation Based on Frequency Conversion of EMG Signals and Image Recognition Using Convolutional Neural Network](#) 1366
Kikuo Asai(The Open University of Japan, Japan)

FA2 Robotic Applications I

Ballroom3, 10:20~11:50

- FA2-1 [Model of Skin Stiffness Including the Radial Artery Pressure](#) 1372
Heewon Min, Myeongjin Kim, Chengjie Li, Doo Yong Lee(KAIST, Korea)
- FA2-2 [Design of 2-DOF Flapping Robot using Spatial 4-bar Linkage Mechansim](#) 1376
JaeHyung Jang(University of Science and Technology, Korea), Gi-Hun Yang(Korea Institution of Industrial Technology, Korea)
- FA2-3 [A cost-effective and miniaturized actuation system for two three-tube concentric tube robots with parallel actuation](#) 1382
Muhammad Umar Farooq(South Korea, Korea), Woo Young Kim, Seong Young Ko(Chonnam National University, Korea)
- FA2-4 [A Piston Finger Device for Restoring the Motor Function of Chronic Plegic Fingers: Development of the Device and Verification of the Effectiveness](#) 1387
Mengsu Wang(Nagoya Institute of Technology, China), Hirofumi Tanabe(Shonan University of Medical Sciences, Japan), Kenji Ooka, Yoshifumi Morita(Nagoya Institute of Technology, Japan), Yukio Kobayashi, Hiroyuki Daiko, Takafumi Iziri, Naoki Kiriya(Meinan Machinery Works Co., Ltd, Japan)
- FA2-5 [Rehabilitation Support Robot for Self-Standing-Up Training of Hemiplegic Stroke Patients : Guiding Control Method Using Two Passive Robots](#) 1391
Masateru Saito, Mizuki Kitamura, Yoshifumi Morita(Nagoya Institute of Technology, Jersey),

Hirofumi Tanabe(Shonan University of Medical Sciences, Japan), Yukio Kobayashi, Takafumi Iziri, Hiroyuki Daiko, Naoki Kiriya(Meinan Machinery Works, Japan)

FA2-6	Jumping Pattern Generation for One-Legged Jumping Robot <i>Akira Umehara, Hun Lim(University, Japan)</i>	1396
FA2-7	Performance Analysis Model Development of Flap Control System using Multi-domain Analysis Platform <i>Hyunjun Cho, Choonsik Joo(Hanwha/Machinery, Korea)</i>	1401

FA3 Symposium on Bio-Mimetic Robot Research (BMRR) I

Ballroom4, 10:20~11:50

FA3-1	A Numerical and Theoretical Study on the Aerodynamics of a Rhinoceros Beetle (Trypoxylus Dichotomus) and Optimization of its Wing Kinematics in Hover <i>Sehyeong Oh, Boogeon Lee, Hyungmin Park, Haecheon Choi(Seoul National University, Korea)</i>	1407
FA3-2	Fabrication of Pressure-dependent Rigidity Controllable Biomimetic Insect Wing for an Ornithopter <i>Hyun Kim, Jong-mo Seo(Seoul national University, Korea)</i>	1410
FA3-3	Soft Robot Dynamic Simulation Using Pseudo Rigid Body Model <i>Jinhyuk Park, Taeyoon Lee, Wooyoung Kim, Youngsuk Hong, Frank Chongwoo Park(Seoul National University, Korea)</i>	1412
FA3-4	Deployable Glider Module for Jump-Gliding Robot <i>Sangmin Baek, Dae-Young Lee, Kyu-Jin Cho(Seoul National University, Korea)</i>	1414
FA3-5	Investigation of Double-Tripod Locomotion of Insect Robot using Differential Gear <i>Changhoon Baek, Jong-mo Seo, Kyujin Cho(Seoul National University, Korea)</i>	1416
FA3-6	Improvement of power-mass budget of biomimetic robots through comparative analysis with insects <i>Sohyun Jung, Ho-Young Kim(Seoul National University, Korea)</i>	1418
FA3-7	Design of Hybrid Actuator using Smart Soft Composite and Ionic Polymer-Metal Composite <i>Jin Woo Oh, Min-Sik Kim(Seoul National University, Korea), Sung-Hoon Ahn(Seoul National University, Korea)</i>	1420

FA4 [OS] Robotics and Its Applications

Mara, 10:20~11:50

FA4-1	SMCSPO based Force Estimation for a Hydraulic Cylinder <i>Jie Wang, KaramDad Kallu, Min Cheol Lee, Jun Hyeok Seo(Pusan National University, Korea)</i>	1422
FA4-2	A study on the P.H.A.S (Piezoelectric energy Harvesting based Access control System) using motor vibration <i>Youngkuk Kwon(SUNHST, Korea), Jangmyung Lee(Pusan National University, Korea)</i>	1426
FA4-3	Location Estimation Process of Low-Cost Pedestrian Dead-Reckoning System using Walk Condition Estimation Algorithm <i>Jinho Kim, Junwoo Song, Jangmyung Lee(Pusan National University, Korea)</i>	1429
FA4-4	Application of Maximized Inter-class Variance for Gender Classification using RGB-Depth Camera <i>Jang Sik Park(Kyungsung University, Korea), Mustafa Eren Yildirim(Bahceshir University, Turkey), Omer Faruk Ince(Kyungsung University, Turkey), Yucel Batu Salman(Bahcesehir University, Turkey), Byung-Woo Yoon(Kyungsung University, Korea), Ibrahim Furkan Ince(Kyungsung Univ.,</i>	1433

Turkey)

- FA4-5 [Implementation of Safety Monitoring System at the Waterfront Based on Video Analysis Technique](#) 1436
Baris Baydarqil, Jang Sik Park, Jong Gwan Song(Kyungsoong University, Korea)

FA5 [Mini] Image Processing and Medical Imaging I

Biyang, 10:20~11:50

- FA5-1 [Environment Recognition for Navigation of Autonomous Wheelchair from a Video Images](#) 1439
Yoshiaki Nakayama, Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan)
- FA5-2 [Detection of Abnormal Candidate Regions on Temporal Subtraction Images Based on DCNN](#) 1444
Mitsuaki Nagao, Noriaki Miyake, Yuriko Yoshino, Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan), Seiichi Murakami(University of Occupational and Environmental Health, Japan)
- FA5-3 [Automatic Identification of Circulating Tumor Cells in Fluorescence Microscopy Images Based on AdaBoost](#) 1449
Kouki Tsuji, Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan), Kazue Yoneda, Fumihito Tanaka(University of Occupational and Environmental Health, Japan)
- FA5-4 [Detection of Lung Nodules on Temporal Subtraction Images Using 3D Sparse Coding](#) 1455
Takahisa Tanaka, Noriaki Miyake, Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan), Takatoshi Aoki(University of Occupational and Environmental Health, Japan), Shoji Kido(Yamaguchi University, Japan)

FA6 [OS] Human Assist Robots

Udo, 10:20~11:50

- FA6-1 [Electrode selection metric for signal demixing in overdetermined sEMG detection](#) 1458
Noel Segura Meraz, Yasuhisa Hasegawa(Nagoya University, Japan)
- FA6-2 [Towards controlling of an upper-limb exoskeleton for motion assist with EEG signals – motion prediction](#) 1460
Sanjaya Bandara, Kazuo Kiguchi(Kyushu University, Japan)
- FA6-3 [Development and Evaluation of Muscle Suit for Arms and Lower Back Support](#) 1462
Eita Nakamura, Hiroshi Kobayashi, Koki Ichinose(Tokyo University of Science, Japan)
- FA6-4 [Proposal of a Fixation Method for Wearable Assistive Systems Using Jamming Transition and the Expansion of an Elastic Bag](#) 1466
Manabu Okui, Kazuya Sekido, Shingo Iikawa, Yasuyuki Yamada, Taro Nakamura(Chuo university, Japan)
- FA6-5 [A Study on the Effect of Vibration Stimulation during Continuous Knee Joint Flexion/Extension Motion for Lower-limb Perception-assist](#) 1469
Kazuo Kiguchi(Kyushu University, Japan), Koki Honda(Kyushu university, Japan)

FA7 [OS] Advances in Process Control and Optimization

Tamna, 10:20~11:50

- FA7-1 [Iterative Convex Relaxation Methods for Adaptive Optimal Input Design in](#) 1471

System Identification

Kwangki Kim(Inha University, Korea)

FA7-2	Closed-loop Multi-rate Identification with zone-MPC using Constrained Subspace Method	1473
	<i>ByungJun Park, Se-Kyu Oh, Jong Min Lee(Seoul National University, Korea)</i>	
FA7-3	On-line Approximated Just-In-Time Model Predictive Control for Batch Trajectory Tracking	1479
	<i>Dong Hwi Jeong, Jong Min Lee(Seoul National University, Korea)</i>	
FA7-4	Synthesis of the optimal heat and water recovery system for reduction of the refinery CO2 emission	1485
	<i>Haeun Yoo, Kosan Roh(Korea Advanced Institute of Science and Technology, Korea), Ali S. Al Hunaidy, Hasan Imran(Saudi Aramco, Saudi Arabia), Jay H. Lee(Korea Advanced Institute of Science and Technology, Korea)</i>	
FA7-5	Model-based Optimization of a Pectin Extraction Process	1490
	<i>Boeun Kim(KAIST, Korea), Ricardo F Caroco, Jakob K Huusom(Technical University of Denmark, Denmark), Jay H Lee(KAIST, Korea)</i>	
FA7-6	Dynamic Programming based Operational Planning of Refinery Combined with Two Stage Stochastic Programming	1495
	<i>Joohyun Shin(Korea Advanced Institute of Science and Technology (KAIST), Korea), Jay H Lee(KAIST, Korea)</i>	

FA8 [OS] Concept, Results and Future Topics of the Research Project on Rehabilitation Robot for Walking Function

Halla, 10:20~11:50

FA8-1	Research and development of wearable auxiliary tool for behavior assistance of elderly who requires nursing care.	1501
	<i>Takehiro Tashiro, Kanta Aoki, Kongkwun Lee, Taisuke Sakaki(Kyushu Sangyo University, Japan)</i>	
FA8-2	Development of Rehabilitation Device for Standing Position Weight Bearing Exercise Using Wii Balance Board	1505
	<i>Yuken Kanemaru, Yuko Kamiya, Toshihiko Shimokawa(Kyushu Sangyo University, Japan), Hiroshi Umezaki(Kashiihara Hospital, Japan), Taisuke Sakaki(Kyushu Sangyo University, Japan)</i>	
FA8-3	A Study of a Standing-Up Motion Training Aid by Non-Electric Source Driving	1508
	<i>Satoshi Kuga, Nobuhiro Ushimi(Kyushu Sangyo University, Japan)</i>	
FA8-4	Concept, results and future topics for the Human Robotics Research Center at Kyushu Sangyo University	1513
	<i>Taisuke Sakaki, Kazuhiko Tsuruta, Yong-Kwun Lee, Nobuhiro Ushimi, Koji Murakami, Yoshimi Matsunoo, Yutaka Ichinose, Tshihiko Shimokawa, Yuko Kamiya, Osamu Kikima, Kanta Aoki, Shinya Morishita, Takehiro Tashiro, Hidetsugu Nishizono(Kyushu Sangyo University, Japan)</i>	

FB2 Robotic Applications II

Ballroom3, 13:10~14:40

FB2-1	Preliminary Research into Control System using Quantified Human Emotions	1519
	<i>Naoya Hasegawa, Yoshihiko Takahashi(Kanagawa Institute of Technology, Japan)</i>	
FB2-2	Concept Design of Personal Mobility Vehicle	1525
	<i>Naomichi Maehara, Mohsen Shavandi, Yoshihiko Takahashi(Kanagawa Institute of Technology, Japan)</i>	
FB2-3	Task Prioritization for Automated Robotic Item Picking	1531
	<i>Albert Causo, Zheng Hao Chong, Ramamoorthy Luxman, Yuan Yik Kok, I-Ming Chen(Nanyang</i>	

Technological University, Singapore)

- FB2-4 [A Mobile Robot Based Watering System for Smart Lawn Maintenance](#) 1537
Bigumjith Dias, Sajeev Mechsy, Wijeratnam Pragithmukar, Asitha Kulasekera(University of Moratuwa, Sri Lanka)
- FB2-5 [A Floating Waste Scooper Robot On Water Surface](#) 1543
Niramon Ruangpayoongsak(King Mongkut's University of Technology North Bangkok, Thailand),
Jakkrit Sumroengrit, Monthian Leanglum(King Mongkut's University of Technology North Bangkok, Thailand)
- FB2-6 [RUNNER BIB NUMBER RECOGNITION SYSTEM](#) 1549
Anuntapat Anuntachai(King Mongkut's Institute of technology Ladkrabang, Thailand)

FB3 Symposium on Bio-Mimetic Robot Research (BMRR) II

Ballroom4, 13:10~14:40

- FB3-1 [Tactile and chemical sensor system for small biomimetic robots](#) 1555
Ohjun Gwon(Seoul National University, Korea)
- FB3-2 [Piezoresistive effects of silicon nanowire for biomimetic inertial sensors](#) 1558
Seohyeong Jang, Bobaro Chang, Jinwoo Sung, Taeyup Kim, Dong-II Dan Cho(Seoul National University, Korea)
- FB3-3 [Proposition on Complex Visual Field Prediction Model of Flying Insect Robot](#) 1560
Jisung Kim(Seoul National University, Korea), *Jong-Mo Seo*(Seoul National University Hospital, Korea)
- FB3-4 [Analysis of Radio Frequency Interference for a Biomimetic Chassis Mode Antenna](#) 1562
Dong-Woo Kim, Sangwook Nam(Seoul National University, Korea)
- FB3-5 [The Comparison of RPL, ORPL, and LOADng for Low-power Biomimetic Robot Networks](#) 1563
Seungbeom Jeong, Saewoong Bahk(Seoul National University, Korea)
- FB3-6 [On the generalized deep learning model of signal detection for molecular communication based biomimetic robots](#) 1565
Byungham Im(Seoul National University, Korea), *Minchul Kim*(SNU, Korea), *Jungwoo Lee*(Seoul National University, Korea)
- FB3-7 [Modeling and Analysis of Operation Time for Photovoltaic Energy Harvesting Assisted Mobile Robot System](#) 1567
Sung-Youb Jung, Jaeha Kim(Seoul National University, Korea)

FB4 [Mini] Machine Vision Applications I

Mara, 13:10~14:40

- FB4-1 [Image-based Hand Pose Classification using Faster R-CNN](#) 1569
Young-Jun Son, Ouk Choi(Incheon National University, Korea)
- FB4-2 [Multi-lane Detection By Finding Epipole using Convolutional Neural Network](#) 1574
Daehun Kim, Jong-Eun Ha(Seoul National University of Science and Technology, Korea)
- FB4-3 [Comparative Analysis of RADAR- IR Sensor Fusion Methods for Object Detection](#) 1576
Taehwan Kim, Sungho Kim(Yeungnam University, Korea)
- FB4-4 [Realization of a hybrid human motion capture system.](#) 1581
Hahyoung Jung(Chungnam National University, Korea)

FB5 [Mini] Image Processing and Medical Imaging II

Biyang 13:10~14:40

- | | | |
|-------|--|------|
| FB5-1 | Image Analysis of Cleft Lip from Moire Image Based on Symmetry Analysis
<i>Shinji Yamada</i> , Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan),
Namiko Kimura, Takako Okawachi, Etsuro Nozoe, Norifumi Nakamura(Kagoshima University
Graduate School of Medical and Dental Sciences, Japan) | 1586 |
| FB5-2 | Automatic Liver Segmentation from Multiphase CT images by Using Level Set Method
<i>Kentaro Saito</i> , Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu institute of technology, Japan),
Akiyoshi Yamamoto(Tobata Kyoritsu Hospital, Japan), Shoji Kido, Masahiro Tanabe(Yamaguchi
Univercity, Japan) | 1590 |
| FB5-3 | Classification of Osteoporosis from Phalanges CR Images Based on DCNN
<i>Kazuhiro Hatano</i> , Seiichi Murakami, Huimin Lu, Joo Kooi Tan, Hyoungseop Kim, Takatoshi
Aoki(Kyushu Institute of Technology, Japan) | 1593 |
| FB5-4 | Image Registration on Vertebral Region from CT Images Based on Salient Region Feature
<i>Suguru Sato</i> , Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan),
Seiichi Murakami, Midori Ueno, Takashi Terasawa, Takatoshi Aoki(University of Occupational and
Environmental Health, Japan) | 1597 |
| FB5-5 | Extraction of Spinal Candidate Region from A Dental MR Imaging
<i>Kenta Suetani</i> , Huimin Lu, Joo Kooi Tan, Hyoungseop Kim(Kyushu Institute of Technology, Japan),
Tatsuro Tanaka, Shinji Kitou, Yasuhiro Morimoto(Kyushu Dental College, Japan) | 1601 |

FB6 Sliding Mode Control and Stability Analysis

Udo, 13:10~14:40

- | | | |
|-------|---|------|
| FB6-1 | Sliding Mode Control of A Newly Designed Cable-Driven Manipulator with Time Delay Estimation
<i>Yaoyao Wang</i> , Surong Jiang, Fei Yan, Bai Chen(Nanjing University of Aeronautics and Astronautics,
China) | 1605 |
| FB6-2 | The Disturbance Rejection Design Based on Physical Feedforward for Solid Oxide Fuel Cell
<i>Zhenlong Wu</i> , Wangying Shi, Donghai Li, Ting He, Yali Xue, Minfang Han(Tsinghua University,
China), Song Zheng(Fuzhou University, China) | 1610 |
| FB6-3 | Novel Fractional Order PD^μ Controller for Open-Loop Unstable Inverted Pendulum System
<i>Prakash Dwivedi</i> (National Institute of Technology, Uttarakhand, India), Sandeep Pandey, Anjali S
Junghare(Visvesvaraya National Institute of Technology, Nagpur, India) | 1616 |
| FB6-4 | Robust Anti-Windup Control Design for PID Controllers
<i>Payam Kheirkhahan</i> (Garmsar branch, Islamic Azad University, Iran, Islamic Republic of) | 1622 |
| FB6-5 | Adaptive Sliding Mode Control Using Radial Basis Function Network for Container Cranes
<i>Ngo Phong Nguyen</i> (Can Tho University of Technology, Viet Nam), Quang Hieu Ngo, Chi Ngon
Nguyen(Can Tho University, Viet Nam) | 1628 |
| FB6-6 | Anti-windup Compensator Synthesis for Cascaded Linear Control System
<i>Muntazir Hussain</i> , Najam us Saqib, Muhammad Rehan, Muhammad Siddique(Pakistan Institute of
Engineering and Applied Sciences (PIEAS), Pakistan) | 1634 |

FB7 [OS/Closed] Vehicle Active Safety and Automated Driving

FB7-1	Probabilistic Prediction based Automated Driving Motion Planning Algorithm for Lane Change <i>Heungseok Chae, Kyongsu Yi(Seoul National University, Korea)</i>	1640
FB7-2	Reconcile Security Requirements for Intelligent Vehicles <i>Madhusudan Singh, Shiho Kim(Yonsei University, Korea)</i>	1646
FB7-3	Backstepping Approach for Lateral Control of Autonomous Vehicle <i>Chang Mook Kang(Hanyang University, Korea), Wonhee Kim(Chung-Ang University, Korea), Seung-Hi Lee, Chung Choo Chung(Hanyang University, Korea)</i>	1652
FB7-4	On Analyzing Parking Lot Pedestrian Behaviors as Particle Mass on Time-Space <i>KangWon Lee(Korea Polytechnic University, Korea)</i>	1656

FB8 Control of Soft/Compliant Actuators

Halla, 13:10~14:40

FB8-1	Comparison of Resonance Ratio Control and Inner Force Control for Position control of Series Elastic Actuator <i>SuHui Kwak, Sehoon Oh(University, Korea)</i>	1659
-------	--	------

FC2 [Mini] Intelligent Robot Technology: SICE-ICROS Joint Session II

Ballroom3, 16:10~17:40

FC2-1	Multi-robot SLAM via Distributed Extended Kalman Filters <i>Toshiki Sasaoka, Yosuke Kishimoto, Kiyotsugu Takaba(Ritsumeikan University, Japan)</i>	1661
FC2-2	Haptic Guidance Steering System of a Quadruped Robot for Robotic Disaster Relief Operations <i>Yoojin Oh, Suhun Jung, Jae Hwan Bong, Shinsuk Park(Korea University, Korea)</i>	1663
FC2-3	Estimation Force of Master-Slave for the End Effector of Hydraulic Servo System Using SMCSPO <i>Karam Dad Kallu, Karam Dad Kallu(Pusan National University, Korea)</i>	1665
FC2-4	Velocity-field control of hydraulic robot with coupled hydraulic circuitry <i>Kwangmin Kim, Minji Kim(Seoul National University, Korea), Dongmok Kim(Doosan Infracore Co. Ltd., Korea), Dongjun Lee(Seoul National University, Korea)</i>	1669
FC2-5	Distributed Control Design for a Platoon of Wheeled Mobile Robots: Application to Teleoperation with Predictive Display <i>Changsu Ha, Jaemin Yoon, Changu Kim, Yonghan Lee, Dongjun Lee(Seoul National University, Korea)</i>	1671
FC2-6	A Study of Eye Contact for Tabletop Robot <i>Yusuke Nozaki, Takashi Yoshimi(Shibaura Institute of Technology, Japan), Kiyooki Takeuchi(Takerobo Corporation, Japan)</i>	1673

FC3 Symposium on Bio-Mimetic Robot Research (BMRR) III

Ballroom4, 15:00~17:00

FC3-1	Modeling and Attitude Control of Flapping MAV Using Disturbance Observer <i>Sungkeun Kim(Hanwha Systems, Korea), In-Rae Kim, Seungkeun Kim, Jinyoung Suk(Chungnam National University, Korea), Sungbong Cho(Agency for Defence Development, Korea)</i>	1676
FC3-2	Experiments on Autonomous Hovering Flight in Flapping-Wing Micro Air Vehicle <i>Seungwan Ryu(Seoul National University, Korea)</i>	1678

FC3-3	Surface Recognition Using Dash Robot <i><u>Kyunghoon Cho</u>, Geonho Cha, Junghyun Oh, Beomhee Lee, Songhwai Oh(Seoul National University, Korea)</i>	1680
FC3-4	Optical Flow Based Three Potential Applications with Biomimetic Vision System <i><u>Minwon Seo</u>, Jongmo Seo(Seoul National University, Korea), Kyoin Koo(University of Ulsan, Korea)</i>	1682
FC3-5	Path Planning for Beacon Robot-Assisted Localization in Wireless Sensor Networks <i><u>Wontae Yu</u>, Byeong-Ho Lee, Seong-Cheol Kim(Seoul National University, Korea)</i>	1684
FC3-6	Understanding Visual Information with Compound Eye Camera <i><u>Hwiyeon Yoo</u>, Geonho Cha, Songhwai Oh(Seoul National University, Korea)</i>	1686
FC3-7	Development of a Mechanism for Flapping Wing Micro Aerial Vehicle <i><u>Junhee Lee</u>, Chongam Kim(Seoul National University, Korea)</i>	1688

FC4 [Mini] Machine Vision Applications II

Mara, 16:10~17:40

FC4-1	Zooming multiple objects using wide-angle camera and PTZ camera in visual surveillance <i><u>Nam-Hun Kim</u>, Jong-Eun Ha(Seoul National University of Science and Technology, Korea)</i>	1690
FC4-2	Anti-saturation and Contrast Enhancement Technique using Interlaced Histogram Equalization (IHE) for Improving Target Detection Performance of EO/IR Images <i><u>Byeong Hak Kim</u>, Min Young Kim(Kyungpook National University, Korea)</i>	1692
FC4-3	Object Tracking Using Particle Filter with Back Projection-Based Sampling on Saliency <i>Nachaya Chindakham, <u>Alongkorn Pirayawaraporn</u>(Kwangwoon University, Korea)</i>	1696
FC4-4	3D Space Recognition for indoor Drone Navigation using Multiple Cameras <i>Kwangsuk Oh(Korea Research Center for Measuring Instruments, Korea), Jong-Eun Ha(Seoul National Univ. of Technology, Korea), <u>Wangheon Lee</u>(Hansei University, Korea)</i>	1699

FP-B Interactive Poster Session II

2F Lobby, 15:00~16:00

FP-B-1	Effect of Model Accuracy in Model Predictive Control for Vehicle Steering System <i><u>Hyunsik Nam</u>, Changsun Ahn(Pusan National University, Korea)</i>	1704
FP-B-2	Risk Statistics based Vehicle Collision Avoidance Control Strategy for Target Vehicles in Car-to-Car Accidents <i><u>Suhyun Jeong</u>, Changsun Ahn(Pusan National University, Korea)</i>	1707
FP-B-3	MPC-Based Power Management of a Parallel Hybrid Electric Vehicle <i><u>Seho Park</u>, Changsun Ahn(Pusan National University, Korea)</i>	1710
FP-B-4	Gain Selection Method for Robustness Enhancement in Sliding Mode Control Combined with Decoupled Disturbance Compensator with Unknown Inertia in Industrial Servo Systems <i><u>Ji-Seok Han</u>, Tae-Il Kim, Ji-Ho Park, Tae-Ho Oh(Seoul National University, Korea), Ji-Hyung Lee, Sang-Oh Kim, Sang-Sub Lee, Sang-Hoon Lee(RS Automation, Korea), Dong-Il Cho(Seoul National University, Korea)</i>	1713
FP-B-5	Applications of Command Shaping Methods for Reducing Residual Vibration in Industrial Servo Systems <i><u>Tae-Ho Oh</u>, Tae-Il Kim, Ji-Seok Han, Ji-Ho Park(Seoul National University, Korea), Ji-Hyung Lee,</i>	1718

Sang-Oh Kim, Sang-Sub Lee, Sang-Hoon Lee(RS Automation, Korea), Dong-Il Cho(Seoul National University, Korea)

- FP-B-6 [Testing-based Software Verification Methodology and Supporting Tool for Railway Software](#) 1722
Jong-Gyu Hwang, Hyun-Jeong Jo, Ui-Jin Jeong(Korea Railroad Research Institute, Korea), In-Taek Lim(MOCT, Korea)
- FP-B-7 [A Backstepping Approach for Looper and Tension Control in Hot Strip Mills](#) 1724
Sangbo Seo(Gachon University, Korea), Hyeonjun Yun(Seoul National University, Korea)
- FP-B-8 [Mask-Substrate Gap Control System Using Electromagnets](#) 1726
Taehyoeng Gu(Seoul National University, Korea), Buhyun Shin(Hanbat National University, Korea), Chang-Hyuk Lee(Korea Electrotechnology Research Institute, Korea), Young-bong Bang(Advanced Institutes of Convergence Technology, Seoul National University, Korea)
- FP-B-9 [Frequency analysis of Fault Currents in LFAC Power Transmission System](#) 1728
Jeongsik Oh, Seonghwan Kim(Mokpo National University, Korea), Seung-Tae Cha(Korea Electric Power Research Institute, Korea), Taesik Park(Mokpo National University, Korea)
- FP-B-10 [Changes in fuel injection pressures and fuel spray quantity of marine diesel engines](#) 1733
Naohiro Yamatani(National Institute of Technology, Toyama College, Japan), Atsumu Tezaki(university of toyama, Japan), Sotomi Ishihara, Toshihiko Nakatani, Noriko Nishii, Hiroshi Mikami(National Institute of Technology, Toyama College, Japan)
- FP-B-11 [Auto lead angle algorithm for high efficiency control of BLDC Motor](#) 1739
Byeong-chan Jeon(Hanyang University, Korea), Won-ki Park, Sung-chul Lee(Korea Electronics Technology Institute(KETI), Korea), Hyun-chul Shin(Hanyang University, Korea)
- FP-B-12 [Sliding Mode Controller design for a PMSG wind Turbine system with varying Torque uncertainties](#) 1742
Sung Won Lee, Kwan-Ho Chun(Chungnam National University, Korea)
- FP-B-13 [Three-phase high power wireless transmission system](#) 1744
Jeongsik Oh, Younggon Kim, Chaejoo Moon, Nohong Kwak(Mokpo National University, Korea), Seungtae Cha(Korea Electric Power Research Institute, Korea), Taesik Park(Mokpo National University, Korea)
- FP-B-14 [An Optimized Approach on Assessing and Implementing Security Controls for I&C Systems in Operating Nuclear Power Plants](#) 1746
Sooill Lee, Yongsik Kim, Cheol Woong Son(KHNP CRI, Korea)
- FP-B-15 [A Method of Cyber Security Vulnerability Test for the DPPS and PMAS Test-bed](#) 1749
Yongsik Kim, Choulwoong Son(the Central Research Institute of KHNP, Korea), Sooill Lee(KHNP CRI, Korea)
- FP-B-16 [A study on Efficient Security Control Assessment Method using System Attributes for Critical Digital Assets in NPPs](#) 1753
choulwoong son(Korea Hydro and Nuclear Power, Korea), Sooill Lee(KHNP CRI, Korea), Yongsik Kim(the Central Research Institute of KHNP, Korea)
- FP-B-17 [Wireless Networked Control System Testbed Using Multiple Pneumatic Levitation Tubes](#) 1757
Yuchang Won, Minkyong Jeon, Seunghyeon Kim, Yongsoon Eun(DGIST, Korea)
- FP-B-18 [Measurement of Attack Preference by Using Analytical Hierarchy Process \(AHP\) for an Operating Nuclear Power Plant](#) 1759
Yongsik Kim(the Central Research Institute of KHNP, Korea), Choulwoong Son(the Central Research Institute of KHNP, Korea), Sooill Lee(KHNP CRI, Korea)
- FP-B-19 [Wireless Control and Monitoring using Programmable Logic Controller \(PLC\)](#) 1763
Ali Moallim Mahmoud, Jae-Min Lee, Dong-Seong Kim(Kumoh National Institute of Technology, Korea)

FP-B-20	Design and implementation of an automated, long-range selfie camera system using LORA <i>Thanh Trung Ngo, Seong Dong Kim(Kumoh National Institute of Technology, Korea)</i>	1768
FP-B-21	Design and Implementation of an Acoustic Leak Monitoring System Test-bed using FPGA Platform <i>Min-Seok Kim, Gwang-Dae Lee, Ho-Sun Ryu(KHNP Central Research Institute, Korea)</i>	1773
FP-B-22	Mobile Edge Cloud Architecture <i>Sayed Chhattan Shah(Hankuk University of Foreign Studies, Korea)</i>	1776
FP-B-23	Adjustment of Replacement Conditions for Genetic Algorithm Used in Optimizing Ion-Trap Electrodes at a Junction <i>Minjae Lee, Yunjae Park, Seokjun Hong, Changhyun Jung(Seoul National University, Korea), Taehyun Kim, Yeongdae Kwon(SK Telecom, Korea), Dongil Dan Cho(Seoul National University, Korea)</i>	1778
FP-B-24	Evaluation of Galvanic Vestibular Stimulation Acceleration Sensation by Myoelectricity of Cervical Shallow-layer Muscles <i>Kazu Irisawa, Shigehiro Toyama, Kenji Kamimura, Fujio Ikeda(National Institute of Technology, Nagaoka College, Japan)</i>	1784
FP-B-25	A study on presentation of lateral acceleration using visually induced illusions of self-motion <i>Tetsuya Takamatsu, Hiroki Maruta, Kenji Kamimura, Shigehiro Toyama(National Institute of Technology, Nagaoka College, Japan)</i>	1786
FP-B-26	Cuboid based Geometric Calibration: A Preliminary Study <i>Soyoung Chung(Seoul Woman's University, Korea), Suji Kim, Hyeeyeon Park(Seoul Woman's University, Korea), Joo-Haeng Lee(ETRI, Korea), Min Gyo Chung(Seoul Woman's University, Korea)</i>	1788
FP-B-27	Hole Classification for Image-based Rendering <i>Inpyo Hong(Korea Electronics Technology Institute, Korea), Youngbae Hwang(KETI, Korea), Byeongho Choi(Korea Electronics Technology Institute, Korea)</i>	1790
FP-B-28	Statistical Evaluation of the Multi-Frequency GPS Ionospheric Scintillation Observation Data <i>Naveed Ahmed, Jiwon Seo(Yonsei University, Korea)</i>	1792
FP-B-29	Performance Assessment of GNSS in Train Control System <i>Weiyi Shuai(Equipment Academy, China), XR Dong(International Cooperation Center, China), Mingqi Yang, Wei Fu, Wenhua Cheng(Equipment Academy, China)</i>	1798
FP-B-30	Tgo Rational Function Biased PN Guidance Law for Precise Impact Angle with First-Order Dynamic Lag <i>Chanyeong Kim, Wonsang Ra(Handong Global University, Korea), Ickho Whang(Agency for Defense Development, Korea)</i>	1804
FP-B-31	A study on the maximum distance of glide type ammunition according to the flight condition <i>Seungje Shin, Minkyu Park(ADD, Korea), Whanwoo Kim(Chung-nam Univ, Korea)</i>	1810
FP-B-32	Neural Network Based Autonomous Navigation for a USV Considering Sea Current <i>Hyeon-Min Kim(Kyungnam University, Korea), Jae-Sik Lim, Wang-Jin Lee, Seung-Woon Park(Kyeong In Tech Co., Korea), Kwangkook Lee, Dong Hun Kim(Kyungnam University, Korea)</i>	1812
FP-B-33	A Multi-Objective Decision Making based Mobile Robot Path Planning Strategy <i>Changwon Kim, Sejin Kim, Bohyun An(Korea Institute of Machinery and Materials, Korea)</i>	1814
FP-B-34	Development of Control Simulator Software for Plant Engineers Training <i>Gwang-Dae Lee, Ho-Sun Ryu, Min-Seok Kim(KHNP Central Research Institute, Korea)</i>	1816
FP-B-35	Evaluation of Bumpless Transfer Capability for Control Transient Mitigation	1820

Ho-Sun Ryu, Min-Seok Kim, Gwang-Dae Lee(KHNP Central Research Institute, Korea)

- FP-B-36 [A Development of Abnormal Condition Monitoring System for Underwater Structure](#) 1823
Young-Jin Kim, Seung-Hwan Choi(Korea Institute of Industrial Technology, Korea)
- FP-B-37 [Development of Video Simulator for Detection and Alarm of Subsea Plant Abnormal State](#) 1825
Jin-Lyul Park, Seung-Gi Lee(Juin Information System, Korea), Young-Jin Kim, Seung-Hwan Choi(Korea Institute of Industrial Technology, Korea)
- FP-B-38 [Loose part impact monitoring for coolant system: An ANN based approach](#) 1827
Ki Hong Im, Jin-Ho Park(KAERI, Korea)
- FP-B-39 [Abnormal condition diagnosis of centrifugal pumps with ANN classifier](#) 1829
Ki Hong Im, Soon-Woo Han(KAERI, Korea)
- FP-B-40 [Design of remote fabrication mock-up](#) 1831
Kiho Kim(Korea Atomic Energy Research Institute, Korea)
- FP-B-41 [Effect of relative incidental angle and wave parameters on the light reflection at sea surface](#) 1832
Sun-Young Yoo, Jisung Kim, Changhoon Baek(Seoul National University, Korea), Won-Seok Lee(Seoul Naional University, Korea), Seongmin Lee(Seoul National University, Korea), Changhan Park, Kanghoon Kwon(HANWHA Systems CO., LTD., Korea), Jong-Mo Seo(Seoul National University, Korea)
- FP-B-42 [Industrial Robot Calibration Method using Denavit – Hatenberg Parameters](#) 1834
Jinwon Lee(Korea institute for Robot industry advancement, Korea)
- FP-B-43 [Bipedal Robot Walking Pattern Generation Based on Capture Point and Minimizing Falling Damage and Posture Recovery](#) 1838
**Sang-hoon Han, Kyung-Soo Kim, Soo-hyun Kim(KAIST) (KAIST, Korea)*
- FP-B-44 [Vibration control of a flexible beam by state feedback using tip accelerometer](#) 1843
Ryoka Ouchi, Jun Imai, Akiko Takahashi, Shigeyuki Funabiki(Okayama University, Japan)
- FP-B-45 [Force-regulated Impact Control of a Reinforced Concrete Box Culvert Chipping Robot](#) 1845
Jaeuk Cho, Seungyeol Lee(Daegu Gyeongbuk Institute of Science & Technology, Korea)
- FP-B-46 [A Stable Working Path Control of Vertical Type Robot System with 7 Joint for Forging Manufacturing Automation](#) 1847
Min-Seong Kim, Jong-Hun Kim(Kyungnam University, Korea), Sung-Hun Noh(YoungChang Robotech Co., Ltd., Korea), Jeong-Suk Kang, Jong-Bum Won(SMEC Co., Ltd., Korea), Sung Hyun Han(Kyungnam University, Korea)
- FP-B-47 [A Study on Intelligent Control of Mobile-Manipulator Robot based on Voice Command for Smart FA](#) 1848
Yang-Keun Jeong(Sinla Information Technology Co., Ltd., Korea), Min-Seong Kim(Kyungnam University, Korea), Hui-Jin Kim(Graduate School of Industry & Business administration Graduate School Kyungnam University, Korea), Woo-Song Lee(SUNJIN Technology co., Ltd., Korea), Yeon-Guk Noh(SFNT Co., Ltd., Korea), In-Man Park(Intem Co., Ltd., Korea), Jang Sik Park(Kyungsung University, Korea), Sung Hyun Han(Kyungnam University, Korea)
- FP-B-48 [A Study on Robust Control of Biped Robot for Cooperative Working](#) 1849
O-Duek Lim(Naval Shipyard, Korea), Min-Seong Kim(Kyungnam University, Korea), Byeong-Gap Moon(KWANGJIN PRECISION Co., Ltd., Korea), Kyu-Hyun Jung(SEYOUNG INDUSTRY Co., Ltd., Korea), Myeong-Hwan Park(ROBOT VALLEY Co., Ltd., Korea), Yong-Un Park(Agency for Defense Development, Korea), Yeong-Jin Lee(AUTOPOWER Co., Ltd., Korea), Ju-Jang Lee(KAIST, Korea), Sung Hyun Han(Kyungnam University, Korea)
- FP-B-49 [A Study on Learning Control of Humanoid Robot for Unmanned FA](#) 1850
Un-Tae Ha, Min-Seong Kim(Kyungnam University, Korea), Seung-Hack Baek(Doosan Heavy

Industries & Construction Co., Ltd., Korea), Dong-Yeon Jeong(Daehoteck Co., Ltd., Korea), Byung-Suk Yoon(Dongmyeongjeong-gi Co., Ltd., Korea), Jung-Eup Gye(Ministry of Trade, Industry & Energy Office , Korea), Jong-Gyo Jung(KAVAS Co., Ltd., Korea), Sung Hyun Han(Kyungnam University, Korea)

FP-B-50	Selecting Telemanipulators for Hazardous Task in a Radioactive Area <i>Seungnam Yu, Hyojik Lee(Korea Atomic Energy Research Institute, Korea)</i>	1851
FP-B-51	Human-Robot Collaboration Strategy for a Reinforced Concrete Box Culvert (RCBC) maintenance robot <i>Seungyeol Lee(Daegu Gyeongbuk Institute of Science and Technology, Korea)</i>	1854
FP-B-52	Remote Control Method for Chipping Robots on Reinforced Concrete Box Culverts <i>Joonsoo Jun, Jaeuk Cho, Seungyeol Lee(Daegu Gyeongbuk Institute of Science and Technology, Korea)</i>	1856
FP-B-53	An Adaptive Position Control Algorithm of a DC Motor based on the First Order Approximation using Recursive Least Squares with Forgetting <i>Kwangseok Oh(Hankyong National University, Korea), Jaho Seo(University of Ontario Institute of Technology, Canada)</i>	1858
FP-B-54	Implementation of ARM-CORE based Power Management Algorithm for Dual-sensing Subsea Environmental Monitoring System <i>JinUk Kim(Eleccom.co.,ltd, Korea)</i>	1862
FP-B-55	Fast Initial Attitude Estimation in Dynamic Condition for INS/GNSS Navigation <i>Yeonjo Kim, Young Jae Lee, Sangkyung Sung(Konkuk University, Korea)</i>	1864

FP-C Interactive Poster Session II

2F Lobby, 16:00~17:00

FP-C-1	ACE-Modularized Knee Mechanism: Design Concept and Kinematics <i>Man Bok Hong(Agency for Defense Development, Korea)</i>	1866
FP-C-2	Peg-in-hole assembly method using variable compliance device with the displacement measurement system <i>Dong Il Park, Hwisu Kim, Chanhoon Park, Taeyong Choi, Byungin Kim, Jongwoo Park(Korea Institute of Machinery & Materials, Korea)</i>	1868
FP-C-3	A COG Trajectory Planning Method of a Quadruped Robot for Stable and Efficient Walking <i>Hyunkyoo Park, Bokeon Kwak, Joonbum Bae(UNIST, Korea)</i>	1870
FP-C-4	Incorporating Building Information to Globalize and Robustify Grid-Based Indoor SLAM <i>Markus Hiller(Friedrich-Alexander University of Erlangen-Nuremberg, Germany)</i>	1872
FP-C-5	Correlation between COP and pitch rate of self-balancing personal mobility : validation via force plate and gyro sensor <i>Jong-Hyeok Park, Joomi Park, Kwan-Woong Gwak(Sejong University, Korea)</i>	1878
FP-C-6	Design of a Human-sized Energy Efficient Quadruped Robot <i>Hoyeon Yeom(Ulsan National Institute of Science and Technology, Korea), Joonbum Bae(UNIST, Korea)</i>	1880
FP-C-7	Dead-Reckoning based Position Estimation of Pipe Climbing Robot with Mother Mobile Robot <i>Jae-Hee Kim, Jae-Cheol Lee, You_Rack Choi(Korea Atomic Energy Research Institute, Korea)</i>	1882
FP-C-8	Towards Training an Agent in Augmented Reality World with Reinforcement Learning	1884

Veera Venkata Ram Murali Krishna Rao Muvva, Naresh Adhikari, Amrita Ghimire(Mississippi State University, United States)

- FP-C-9 [Incremental Vocabulary Tree for Binary Features](#) 1889
Jungho Kim, Youngbae Hwang(Korea Electronics Technology Institute, Korea)
- FP-C-10 [Evaluation of Variable Focus DCX Lens Module for Consumer Electronics](#) 1891
Dong-Soo Choi, Jaeu Jeong, Sang-Youn Kim(Korea University of Technology and Education, Korea)
- FP-C-11 [Orientation Estimation of a Mobile Robot Using Vanishing Point in Indoor Environment](#) 1893
Chulhong Kim, TaeJae Lee, Dong-Il Dan Cho(Seoul National University, Korea)
- FP-C-12 [Convolutional Neural Network-Based Pose-Graph SLAM System Using a Monocular Vision Sensor](#) 1898
JungWon Park, TaeJae Lee, Chulhong Kim, Dong-Il Dan Cho(Seoul National University, Korea)
- FP-C-13 [Efficient Recognition for Vision-based Homing Strategy](#) 1903
Jungho Kim, Sung-Joon Jang(Korea Electronics Technology Institute, Korea)
- FP-C-14 [Comparative study of underwater reconstruction using imaging sonar and laser scanner](#) 1905
Yeongjun Lee(Korea Research Institute of Ships & Ocean engineering, Korea), Tae-Kyeong Yeu, Hyun-Taek Choi(Korea Research Institute of Ships & Oceans engineering, Korea)
- FP-C-15 [Localization Using Reference Line and Vanishing Point](#) 1907
Hyesu Jang, Youngji Kim, Ayoung Kim(KAIST, Korea)
- FP-C-16 [Weather Invariant Place Recognition Using 360-Degree Image Processing](#) 1909
Lucas Younghun Cho, Hyesu Jang, Youngsik Shin, Joowan Kim, Ayoung Kim(KAIST, Korea)
- FP-C-17 [Video Upscaling Method Based on ADJSRCNN and Color Histogram Similarity](#) 1912
Jong Hyeong Kim(Seoul Tech., Korea), KyungJae Jang, Jang Jae Won(Seoul National University of Science and Technology, Korea)
- FP-C-18 [A Nondeterministic Flowchart-based Script Editor](#) 1914
Mi-sook Kim, Wook-jae Jo, Hong Seong Park(Kangwon National University, Korea)
- FP-C-19 [The Safety Design Concept for Surgical Robot Employing Degree of Autonomy](#) 1918
Joel Ryu, Hyunggun Joo, Jongwoon Woo(KIRIA(Korea Institute for Robot Industry Advancement), Korea)
- FP-C-20 [Evaluation of 2D-3D registration of broken femur using simplified phantom C-arm](#) 1922
Asaduz Zaman, Seong Young Ko(Chonnam National University, Korea)
- FP-C-21 [Development of a Wearable Device based on Reaction Wheels to deliver Kinesthetic Cues for Balance Training](#) 1926
Muhammad Raheel Afzal, Carlos Ernesto Palo Peña(Gyeongsang National University, Korea), Jungwon Yoon(Gwangju Institute of Science and Technology, Korea)
- FP-C-22 [Robotic Guidance System for Distal Screwing of Intramedullary Nail : Evaluation on Success Rate of Drilling using Model Bone](#) 1930
Liming An, Woo Young Kim, Seong Young Ko(Chonnam National University, Korea)
- FP-C-23 [Design of a Haptic Walker system based on cable driven actuator for Lower Limb Rehabilitation](#) 1933
Hosu Lee, Muhammad Raheel Afzal(Gyeongsang National University, Korea), Jungwon Yoon(Gwangju Institute of Science and Technology, Korea)
- FP-C-24 [Terrain Identification by Fuzzy Logic and Its Application to The Smart Prosthetic Ankle](#) 1937
Yoseph Lee(Sogang University, Korea), Doyoung Jeon(Sogang university, Korea)

FP-C-25	<p>Development of measurement system for robotic walking training device to improve exercise effect in convalescence rehabilitation</p> <p><i>Katsushi Ogawa</i>(Osaka Electro-communication University, Japan), <i>Hiroki Aoyama, Hirofumi Hori</i>(Aino University, Japan), <i>Kazuo Yonenobu</i>(Osaka Yukioka College of Health Science, Japan), <i>Seonghee Jeong</i>(Osaka Electro-communication University, Japan)</p>	1939
FP-C-26	<p>Estimation and validation of dynamic ankle characteristics for ankle spasticity assessment</p> <p><i>Wonseok Shin, Jung Kim</i>(KAIST/Mechanical engineering, Korea)</p>	1941
FP-C-27	<p>Overground Gait Pattern of Stroke Survivor by Smartphone-based Auditory Cue using IMU and FSR: A Preliminary Study</p> <p><i>Byung-Woo Ko, Won-Kyung Song</i>(National Rehabilitation Center, Korea)</p>	1942
FP-C-28	<p>Compliance control of a rescue robot in interact with ground</p> <p><i>Byunghun Choi, Wonsuk Lee, Gyuhyun Park, Youngwoo Lee, Seongil Hong, Shincheon Kang</i>(Agency for Defense Development, Korea)</p>	1943
FP-C-29	<p>Stochastic Identification of Terrain Parameter for Lunar Exploration Rover Using a Bayesian Approach</p> <p><i>Kun-Jung Kim, Byeong-Seop Sim, Kee-Ho Yu</i>(Chonbuk National University, Korea)</p>	1945
FP-C-30	<p>Test and Evaluation for the Autonomous Multi-Zone Navigation Coverage Test in IEC 62885-7</p> <p><i>Jaesub Shin</i>(Korea Institute for Robot Industry Advancement, Korea)</p>	1949
FP-C-31	<p>RT Educational Tool to Support Learning Physics in High School Curriculum - Development and Evaluation of the RT Educational Tool -</p> <p><i>Katsushi Ogawa, Hiroaki Tanaka, Seonghee Jeong</i>(Osaka Electro-communication University, Japan)</p>	1952
FP-C-32	<p>Virtual Bubble Filtering based on heading angle and velocity for Unmanned Surface Vehicle</p> <p><i>Soon-Geul Lee, Ihn-Sik Weon</i>(Kyung Hee University, Korea), <i>Jae-Kwan Ryu</i>(LIG Nex1, Korea)</p>	1954
FP-C-33	<p>IR-UWB Radar Based Near-Field Intentional Eyelid Movement Sensing Under Fixed Head and Body Motions</p> <p><i>Sunghwa Lee, Jiwon Seo</i>(Yonsei University, Korea)</p>	1959
FP-C-34	<p>Mobile robot localization and path planning based on Feature recognition and Dijkstra's Algorithm</p> <p><i>Ihn-Sik Weon, Vinicio Rosas Cervantes, Soon-Geul Lee</i>(KyungHee University, Korea)</p>	1963
FP-C-35	<p>Development of the Sensor Network Algorithm for Maximizing the Electricity Generation of the Smart Photovoltaic (PV) Blind</p> <p><i>Hyuna Kang, Taehoon Hong, Minhyun Lee, Kwangbok Jeong, Jeongyoon Oh</i>(Yonsei University, Korea)</p>	1965
FP-C-36	<p>Walking monitoring using an IMU and encoders for a walker user</p> <p><i>Toan Huu Duong, Soo Young Suh</i>(University of Ulsan, Korea), <i>Duong Duy Pham</i>(College of Technology - The University of Danang, Viet Nam)</p>	1967
FP-C-37	<p>Electro-active Polymer Actuator Based On Cellulose Acetate-Graphene and Ionic Liquid Nanocomposites</p> <p><i>Minghui Nan, Fan Wang, Sunghoon Cho, Chang-Sei Kim, Jong-Oh Park, Eunpyo Choi</i>(chonnam national university, Korea)</p>	1969
FP-C-38	<p>Attitude Dependent Gyro Bias Calibration Technique for RLG based Rotational Inertial Navigation System</p> <p><i>Hae-sung Yu, Inseop Lee</i>(Agency for Defense Development, Korea), <i>Sangjeong Lee</i>(Chungnam National University, Korea)</p>	1971
FP-C-39	<p>Development and Analysis of a Soft Skin Interface for Surface Electromyography (sEMG) Signals</p>	1973

Hwayeong Jeong(KAIST, Korea), Pilwon Heo(Intelligent Instrumentation and Automation (i2A Systems), Korea), Junghoon Park, Jung Kim(KAIST, Korea)

FP-C-40	Development of a soft sensor system for human joint motion analysis <i>Heeseon Hwang(KIRO, Korea)</i>	1975
FP-C-41	Performance analysis of the jamming signal geolocation system using on-board AoA estimator mounted on UAV <i>Sanghyouk Choi(Electronic and Telecommunications Research Institute, Korea)</i>	1976
FP-C-42	A new method for obtaining multiple array signal measurements using single RF channel <i>Sanghyouk Choi(Electronic and Telecommunications Research Institute, Korea)</i>	1980
FP-C-43	Development of an Algorithm for Multimodal Head Support System (MHSS) on behalf of Preventing Drowsy Driving <i>Sukgyu Koh, Bo-Ram Cho, Jongil Lee(KITECH, Korea), Hyeok-Dong Kweon(Dong-A Metal Tech Co., Ltd., Korea), Suwoong Lee(KITECH, Korea)</i>	1985
FP-C-44	Kalman Filter Based Multiple Human Tracking Method in Multi-Camera Environment <i>Gyeore Lee(KIST School, Korea University of Science and Technology, Korea), JongSuk Choi, Yoonseob Lim(Korea Institute of Science and Technology, Korea), Bokyeong Lee(Kwangwoon University, Korea)</i>	1987
FP-C-45	The Effective Biometric Fingerprint Sensor Quality Analysis System using NIST NFIQ Algorithm <i>Young-Hyun Baek(UnionCommunity Co., Ltd, Korea)</i>	1990
FP-C-46	Comparison of Repulsive Force Formula between Two Permanent Cylindrical Magnets According to Distance <i>Seongho Bak(Daegu Gyeongbuk Institute of Science and Technology, Korea), Jeon IL Moon(DGIST, Korea), Tae Hun Kang(Daegu Gyeongbuk Institute of Science & Technology, Korea)</i>	1992
FP-C-47	Underground Localization using Magnetic Field and Concurrent Normalized Cross-Correlation <i>Hyun Myung, Jong Heon Kim, Byeolteo Park(KAIST, Korea)</i>	1994
FP-C-48	Co-Pilot: Vehicle/Driver Cooperative and Autonomous Driving System <i>Samyeul Noh, Kyoungwan An, Wooyong Han(Electronics and Telecommunications Research Institute, Korea)</i>	1996
FP-C-49	The Method of Quantitative Reliability Evaluation for Railway System Software <i>Hyunjeong Jo, Jong-Gyu Hwang(Korea Railroad Research Institute, Korea)</i>	1998
FP-C-50	Robotic Bin Picking Using Multiple Features for Manufacturing Process Automation <i>Sangseung Kang(ETRI, Korea)</i>	2000
FP-C-51	The Development of Step Count Detection Algorithm using Self-paced Treadmill <i>Hyun Ju Lee, Sung Ho Park, Tae Hun Kang, Jeon Il Moon(DGIST, Korea)</i>	2002
FP-C-52	A Study on the development of customized gripper using axiomatic design for assembly object <i>Hyeonuk Kim, Soonwoong Hwang, Younsung Choi, Inhyuk Baek, Jeonghoon Choi, Junhyung Heo, Chang Soo Han(Hanyang Univ., Korea)</i>	2004
FP-C-53	Autonomous Drone Design Based on FIR Filtering <i>Hyun Ho Kang, Sung Hyun You, Sang Su Lee, Choon Ki Ahn(Korea University, Korea)</i>	2006
FP-C-54	Energy Management System for Legacy Devices Based on Adaptive Neuro Fuzzy Inference System <i>Sung Hyun You, Hyun Ho Kang, Choon Ki Ahn(Korea University, Korea), Ramesh Agarwal(Washington University in St. Louis, United States)</i>	2008

FP-C-55 [Enhancement of Surface Plasmonic Resonance Effect through Adjustment of pH Level \(A SERS-Imposed Paper Chip\)](#) 2010
Wansun Kim, Samjin Choi(Kyung Hee University, Korea)

SA4 [Mini/for Korean] AI Applications

Mara 09:00~12:00

- SA4-1 [Analysis of the Yearbook from the Korea Meteorological Administration using a Text-Mining Algorithm](#) 2012
Yung-Seop Lee(Dongguk University, Korea), Changwon Lim, Hyunseok Sun(Chung-Ang University, Korea)
- SA4-2 [An Agent-based System for Abnormal Flow Detection in Semiconductor Production Line](#) 2015
DongChang Lee, SungBae Cho(Yonsei University, Korea)
- SA4-3 [A Deep Learning Based Video Classification System Using Multimodality Correlation Approach](#) 2021
Jihoon Yang, Jungheon Lee, Youngsan Koh(Sogang University, Korea)

FP-C-56 [Development of multi-agent systems with distributed solutions for energy problems](#)
Aigerim Altayeva, Batyrkhan Omarov, Young Im Cho(Gachon University, Korea)

FP-C-57 [Machine Learning based Pattern Recognition and Classification Framework Development](#)
Batyrkhan Omarov, Young Im Cho(Gachon University, Korea)

FP-C-58 [Real Time System Identification of a Small Cropped Delta UAVs using Flight Test Methods](#)
Subrahmanyam Saderla(Gyeongsang National University, Korea)